

THE IRON AGE

New York, Thursday, May 3, 1906.

The Ingersoll Combined Horizontal and Vertical Spindle Milling Machine.

Views of one of the latest type of combined horizontal and vertical spindle milling machine manufactured by the Ingersoll Milling Machine Company, Rockford, Ill., for the Morgan Engineering Company, Alliance, Ohio, are given in Figs. 1 and 2. This machine was built with two heads to meet the requirements of the purchaser, but is furnished with one, two, three or four heads, according to the work to be done, and with various width, height and length capacities. Fig. 1 shows the operating side of the machine and Fig. 2 is an opposite view, showing the feeding mechanism for the table and the up and down feed. The miller is of exceedingly heavy construction throughout, the housings being 19 inches wide in the face and 36

inches deep, and has a total weight of approximately 60,000 pounds. The table is 36 inches wide over all and has a working surface 30 inches wide by 20 feet long. An oil trough is cast all around and the T slots are cut from the solid. The length of the bed is 30 feet. The table can be adjusted by hand or power in either direction by a lever on the operating side, which engages a double clutch and also controls the rail movement. The table feed, which can be operated at a speed up to 10 inches per minute, is positive, automatic and reversible, and has eight changes for each cutter speed. For the purpose of overcoming the shock in changing from one speed to another a slip gear is provided with internal conical faces fitting on conical bronze bushings. These bushings are pressed together by a powerful spring, which is adjusted by nuts to give the proper tension. Details of the change feed box are given in Fig. 3, the slip gear being shown at A. The sleeve B is splined to the driven shaft, and the sleeve C is attached to the shaft by a sliding feather, so that the two rotate in unison. D is the spring, which is adjusted by lock nuts E and F. The gear changes in the box are secured from the oper-

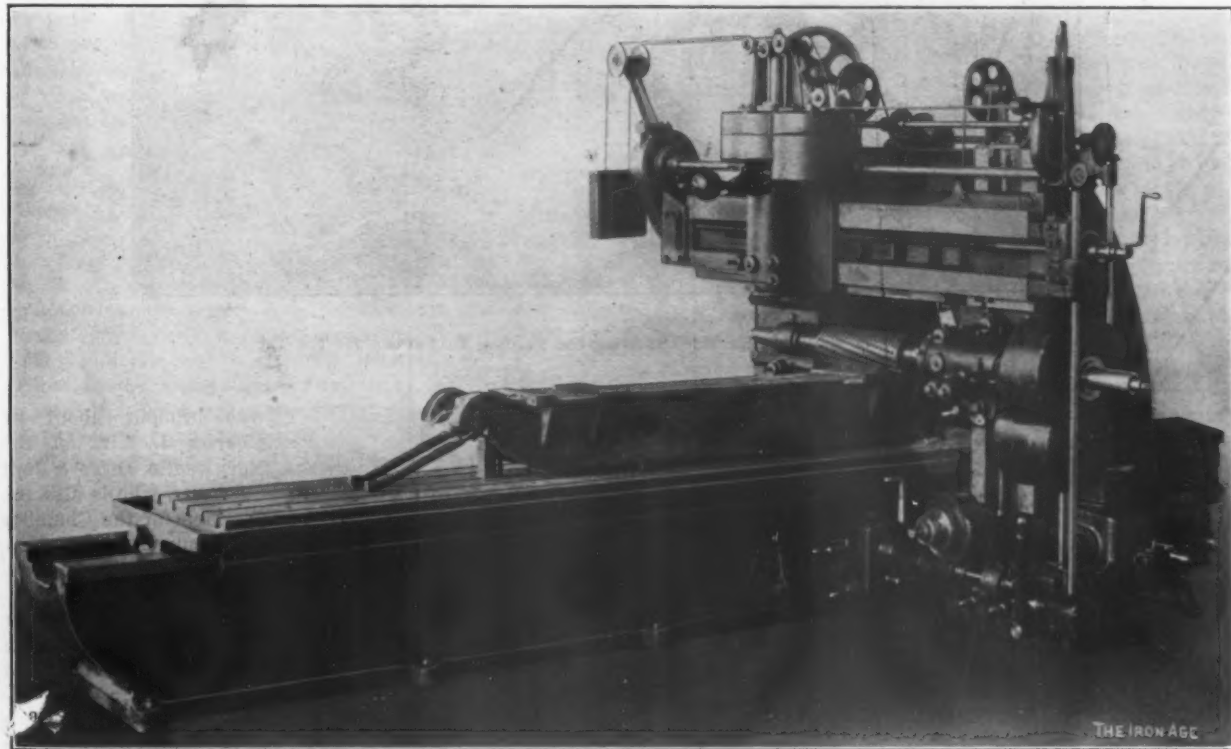


Fig. 1.—The Operating Side of the Ingersoll Combined Horizontal and Vertical Spindle Milling Machine.

ating side of the machine by manipulating rock shafts extending through the bed. In Fig. 1 may be seen the detachable handle by which these shafts are oscillated. On the opposite side of the machine the shafts carry pinions, shown at G and H in Fig. 3, which engage racks on sliding rods connected with the clutch shippers I and J. This mechanism obviates the necessity of the operator's walking around the machine when a change of feed is desired. The feed, as before stated, is communicated through the slip gear A, and is transmitted through the gears in the feed box from the bevel gears K and L. The clutches I and J may each be engaged in two positions, and for each position of one the two positions of the other give two speeds, so that there are four speeds in all. These may easily be traced out by referring to Fig. 3. When the clutch I is engaged to the left the drive is from the shaft h through gears j and i to the intermediate shaft e, and

from e either through d and c, or l and k, depending upon the position of the clutch J, to the shaft b, carrying the gear a, which meshes with the slip gear A. When the clutch I is thrown to the right the gear g is clutched to it and moves with the shaft h, driving the gear f, and with it the intermediate shaft e. If at the same time the clutch J is thrown to the right the gear l, driving k, transmits the movement to the shaft b, or if the clutch J is thrown to the left the drive is through the gears d and c.

The horizontal saddle is mounted on the right hand side of the machine, and can be raised or lowered by hand or power, and has a vertical feed. This saddle has the same change of feeds as the table, being actuated by the same mechanism. The cross rail is counterbalanced, and can be raised or lowered by hand or power. The arbor support is on the left hand side of the machine and is counterweighted and operates on a rack. For arbor work the side head and arbor support are suspended from the cross rail by means of swing bolts, and they are raised and lowered by raising and lowering the counterbalanced cross rail.

The vertical saddle has an automatic feed across the

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table in either direction by the same mechanism that actuates the table, and also has a hand adjustment. The vertical spindle is counterbalanced. The spindle quills are 9 inches in diameter and have an adjustment of 10 inches by rack and pinion.

All of the gears are cut from the solid from steel cast-

The Standard Steel Car Company's New Plant.

The Standard Steel Car Company, Butler and Pittsburgh, Pa., will locate a plant for the building of cars at New Castle, Pa., to occupy the land and buildings formerly occupied by the New Castle Tube Company. The deal

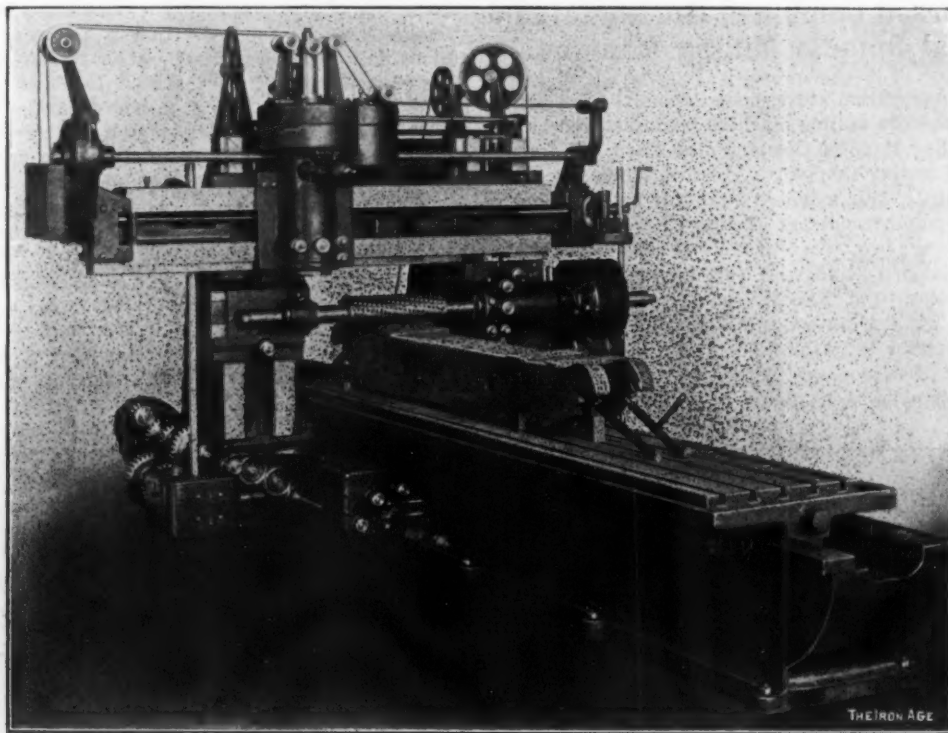


Fig. 2.—View of the Opposite Side, Showing the Feeding Mechanism for the Table.

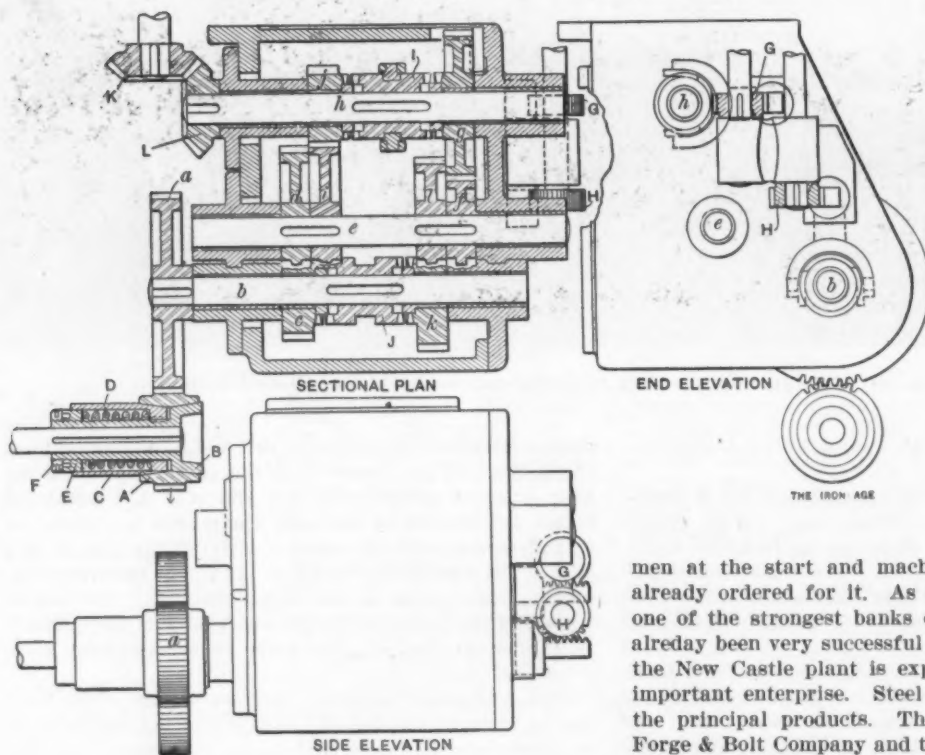


Fig. 3.—Details of the Table Change Gear Feed Box.

ings or forgings, and are encased so as to run in oil. The machine is adapted to use any size face mills up to 20 inches in diameter, and drives them to their full capacity. The machine is driven by a 30 horse-power variable speed motor.

was brought about by Charles J. Kirk of the New Castle Forge & Bolt Company, who is also the president of the Chamber of Commerce of New Castle. The changes necessary to make the present buildings suitable for the car works will begin at once and it is expected that they can be completed inside of 60 or 90 days. The building is 700 feet long, 110 feet wide, and being of brick with a slate roof, it is one of the finest buildings for manufacturing purposes ever erected in the Shenango Valley. The New Castle plant is to employ 1000

men at the start and machinery of modern pattern is already ordered for it. As this company is financed by one of the strongest banks of Pittsburgh, and as it has already been very successful in the car building business, the New Castle plant is expected to at once become an important enterprise. Steel cars and car trucks will be the principal products. The plants of the New Castle Forge & Bolt Company and the Pennsylvania Engineering Works are convenient to the new plant. Extensive improvements are to be made to the buildings now on the ground and other buildings will be erected. The plant is connected with the Pennsylvania and the Buffalo, Rochester & Pittsburgh railroads.

The decline in American shipbuilding is set forth in the records of the United States Bureau of Navigation, which show that the number of ships built in America in

1905, not including warships, was 1054, with a gross tonnage of 306,563, as compared with 1065 and 265,104, respectively, in 1904; 1159 and 381,970 in 1903, 1262 and 429,327 in 1902 and 1322 and 376,129 in 1901.

An Endurance Test of a Gas Producer.

Some skepticism having been expressed as to the claims made by the Fuel Testing Committee of the United States Geological Survey regarding the power producing efficiency of coals used in the gas producer and gas engine, a so-called "endurance test" was recently undertaken by Prof. R. H. Fernald, who has charge of the Survey's gas producer plant at St. Louis. The results of this run, which began March 28 and continued until April 1, a period of 24 consecutive days, are particularly valuable and suggestive. They afford indisputable proof of the possibility of operating producer plants continuously for power purposes with the use of bituminous coals.

This test was made possible through the courtesy of Donk Brothers Coal & Coke Company, St. Louis, which generously supplied, without charge to the Government, 150 tons of screened coal from its mine No. 3, located near Troy, Ill. The average of six analyses of this coal showed 14.68 per cent. moisture, 30.98 per cent. of volatile combustible, 42.93 per cent. of fixed carbon and 11.41 per cent. of ash, including 1.33 per cent. of sulphur. The British thermal units per pound of dry coal were 12,343.

Details of Plant and Preparations.

This test was made in the plant in which all the Government fuel tests have been conducted since October, 1904. This installation consists of a Taylor pressure producer gas plant of 250 horse-power capacity, furnished by R. D. Wood & Co., Philadelphia, and a vertical three-cylinder single acting Westinghouse gas engine of 235 brake horse-power capacity, operating on producer gas. The engine is belted to a 175-kw. Westinghouse generator. The electrical energy developed during this test was dissipated through a water rheostat, designed to readily control the load upon the engine.

The coal was broken to about 3-inch egg size and delivered to the charging floor of the producer by a belt conveyor. It was charged to the producer at intervals varying from 25 to 30 minutes. The weight of each charge was 150 pounds. The hopper through which the coal passed to the producer is a double seal hopper with belt and cover plate. The producer was charged by hand. The bell is so designed that the coal is evenly distributed over all portions of the fuel bed, which was kept in uniform condition by hand poking from the top about every half hour.

Treatment of the Gas.

The gas left the generator at an average temperature of 644 degrees F. and passed through a water seal dust collector and then to the scrubber. From there the gas passed directly to a centrifugal tar extractor, which removed the greater portion of the tar left in the gas. It was then delivered directly to the holder. No further attempt was made to purify it, since experiments at this testing plant have proved conclusively that sulphur carried in the gas has no injurious effect upon the engine. From the holder the gas passed through a meter, which has a capacity of 30,000 cubic feet per hour, on its way to the engine cylinders.

During this entire test calorimetric determinations of the heat value of the gas were made every 20 minutes and volumetric analyses were made every two hours. The average heat value of the gas for the entire run was 156.1 British thermal units per cubic foot. This gas contained no hydrogen disulphide, 9.2 per cent. carbon dioxide, no oxygen, 0.4 per cent. ethylene, 20.9 per cent. carbon monoxide, 15.6 per cent. hydrogen, 1.9 per cent. methane and 52 per cent. nitrogen.

Observations relating to the tar extracted during this test are of special significance, as it has often been stated that no plant which separates the tar mechanically could run more than five or six days without shutting down. The total tar extracted during this test amounted to 14,950 pounds, or about 143 pounds of tar for every ton

of coal burned in the producer. This tar did not contain over 10 per cent. of water.

Gas Passages Were Tortuous.

As this plant was designed for general test purposes, the passages through which the gas was obliged to pass were far more tortuous than would have been the case in a plant installed merely for the production of power. In passing from the dust collector to the scrubber the gas was forced to make three right angle turns and pass through a water seal valve, traversing a distance of about 20 feet instead of 3 feet, as would have been the case in an ideal arrangement. Owing to the deposit of tar in the water seal valve the test was brought to a close after 24 days. Without this unfortunate combination of piping more notable endurance records should be made than the surprising 24-day test here recorded.

The ashes were removed about once every 48 hours without shutting down the plant. This was accomplished by simply reducing the pressure under which the producer was operated and running the plant on the suction basis during the hour required for removing the ashes. The men worked with entire ease and comfort during this period.

Engine and Producer in Good Order.

The engine ran in perfect order at all times during the period of 24 days and at the end of the test was found in unimpeachable condition. Even a cleaning was not necessary. It is still operating with remarkable regularity and shows no ill effects from the strain to which it was subjected. The producer plant was also found in excellent condition, and the regular tests are now going on as usual.

Owing to the fact that final calibrations of some of the instruments used in this test have not been received, the official horse-power carried during the test and the dry coal required per brake horse-power per hour cannot be given. The approximate figures show, however, that an average horse-power of 227 was used during the test, and an average of 1.39 pounds of dry coal consumed per brake horse-power per hour.

The Chicago Pneumatic Tool Company.

President J. W. Duntley makes the following statement of profits and surplus for the quarter ending March 31, 1906:

Profits	\$233,322.59
Less depreciation of plant, repairs and amount written off for experimenting and perfecting new tools	36,327.77
Balance	\$196,994.82
Less bond interest for the quarter	\$28,750
Less sinking fund reserve	12,500
	41,250.00
Available for dividend	\$155,744.82
Less quarterly dividend No. 13	61,087.83
Balance carried to surplus	\$94,656.99
<i>Surplus Account.</i>	
Surplus brought from 1905	\$536,292.15
Less appropriation on account of building of plant at Fraserburg	25,000.00
	\$511,292.15
Surplus for the quarter ending March 31, 1906	94,656.99
Surplus carried forward	\$605,949.14

Including dividend No. 13, paid as shown above, the company has disbursed the sum of \$1,120,881.98 in dividends to its stockholders since its organization, December 28, 1901. In addition to this, there have been paid out the sum of \$460,000 in interest to the holders of the company's bonds, and the sum of \$200,000 to the trustees of the sinking fund of the company for the retirement of bonds, not including the amounts reserved in the foregoing statement.

The company's business for the month of April is about 10 per cent. in excess of the same period in 1905, and everything seems to indicate that the year, as a whole, will be a very successful one.

The G. C. Kuhlman Car Company has recently completed the first gasoline electric car for the Lake Shore & Michigan Southern Railroad. A 220 horse-power gasoline engine, in connection with an electric generator, fur-

nishes the motive power for this car, which is designed for a speed of 65 miles per hour. All of the machinery being located beneath the car, the passenger carrying capacity is not lessened. Like an ordinary electric car, it may be operated from either end. Its equipment includes a hot water heating system, electric lighting and high speed brakes.

The Production of Wire Rods in 1905.

The American Iron and Steel Association has just compiled the statistics of wire rod production in the United States in 1905, as gathered from the manufacturers. The production of iron and steel wire rods in this country in 1905 amounted to 1,808,688 gross tons, against 1,699,028 tons in 1904, an increase of 109,660 tons, or over 6.4 per cent. Of the total production in 1905 1,807,407 tons were steel rods and 1281 tons were iron rods. In 1904 the steel wire rods rolled amounted to 1,697,862 tons and the iron rods to 1166 tons. The maximum production was reached in 1905 and the year of next largest production was 1904. The following table gives the production of iron and steel wire rods by States in the two years:

States.—Gross tons.	1904.	1905.
Massachusetts, Connecticut, Rhode Island,		
New York and New Jersey.....	228,289	249,835
Pennsylvania, Kentucky, Alabama and Ohio	973,801	1,038,212
Indiana, Illinois and Colorado.....	496,938	520,641
Totals	1,699,028	1,808,688

Pennsylvania made the largest quantity of wire rods in 1905, its production amounting to over 32 per cent. of the total for the whole country. Illinois was second, Ohio third and Massachusetts fourth. Eight other States, Indiana, Kentucky, Colorado, New York, New Jersey, Alabama, Rhode Island and Connecticut; also rolled wire rods in 1905 in the order named. All the States mentioned also rolled iron or steel wire rods in 1904.

Below is given the production of iron and steel wire rods from 1888 to 1905. Prior to 1888 wire rods were not separately classified:

Gross tons.	Gross tons.	Gross tons.
1888.....279,769	1894.....673,402	1900.....846,291
1889.....363,851	1895.....791,130	1901.....1,365,934
1890.....457,099	1896.....623,986	1902.....1,574,293
1891.....536,607	1897.....970,736	1903.....1,503,455
1892.....627,829	1898.....1,071,683	1904.....1,699,028
1893.....537,272	1899.....1,036,398	1905.....1,808,688

In the calendar year 1905 the exports of wire rods from the United States amounted to 6514 gross tons, as compared with 20,073 tons in 1904. Our imports of wire rods in 1905 amounted to 17,616 tons, as compared with 15,313 tons in 1904.

A Niagara Combined Canal and Power Scheme.—

Eastern capitalists have secured control of the franchise of the old Niagara County Irrigation & Water Supply Company, Niagara Falls, N. Y. This company was the one organized by William Love, who planned to excavate a surface canal from La Salle, five miles above the city of Niagara Falls, to a point on the Niagara escarpment at Lewiston. It is said that the new owners will continue the work of canal building, but instead of extending it to the Niagara escarpment at Lewiston they will go only about half the distance, turning the canal toward the gorge and lower river at a point known as the Devil's Hole, just outside the city boundaries and in the town of Lewiston. A very high head will be obtainable at this point, probably 300 feet. The canal will be about 5 miles long, 200 feet wide and 18 feet deep, the plans contemplating a waterway large enough to be used as a ship canal, so that shipping may run down the river from Lake Erie and enter the canal, the vessels moving to the manufacturing plants along the waterway. All this will be to the east of the city of Niagara Falls. It is proposed to develop 200,000 horse-power, and it is said the company will use 30,000 horse-power of this amount in the operation of iron works. The engineering contract has been awarded to Viele, Cooper & Blackwell of New York. Transmission lines to Plattsburgh and Cleveland are part of the plan.

The Latta-Martin Pneumatic Pumping System.

The use of compressed air as a medium for elevating and conveying water is familiar to many as applied in the air lift system. The Latta-Martin pneumatic pumping system is one based on a very different principle, involving the use of what is known as a pneumatic displacement pump. This pump is located at the source of water supply and is operated with compressed air from a compressor and receiver in the power plant, which may be a considerable distance away, since compressed air can be economically transmitted through even very long pipe lines. The arrangement localizes the attendance required, as the pump does not need attention and no additional services are called for other than those of the regular engineer in seeing that the air compressor is properly lubricated. The displacement pump is claimed to be absolutely automatic, without dead center; to be

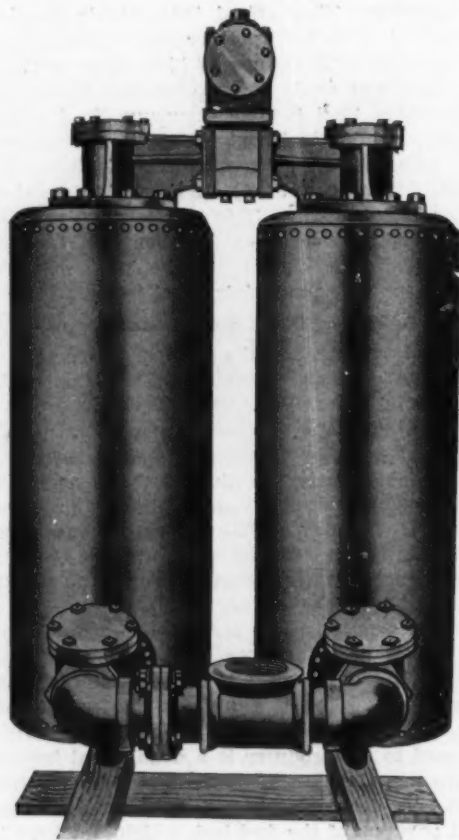


Fig. 1.—A Small Size Pneumatic Displacement Pump Made by the Latta & Martin Pump Company, Hickory, N. C.

unimpaired by muddy and gritty water; to work under any depth of submergence, and to be unaffected by rise and fall of water supply. It has no pistons, plungers nor floats to wear out or be replaced; no stuffing boxes nor glands, and no outside moving parts, to require lubricating or packing. The principal advantages of the system are that a pump house is not necessary at the water supply, nor an attendant, and that it makes it practicable to pump water from any reasonable distance or from as many sources as may be desired.

Fig. 1 is an exterior view of one of these pumps, and Fig. 2 is a cross section with sectional details at right angles, from which the operation may be easily understood. The pump consists of two plain cylinders with the valve mechanism attached to their heads. This valve mechanism comprises a main valve and an auxiliary valve, shown in the detail sections, each operated by air pistons, and an oscillating slide valve A under the main valve. B and B are plain covered copper buckets, which, when the pump is installed, become and remain full of water. Particular attention is called to the fact that these are not floats. The buckets are hung on steel rods connected to steel levers which operate the oscillating slide valve A. The buckets are enclosed in galvanized housings, C and C, which are connected to a header on top of the cylinders by pipes E and E.

The operation of the pump is very simple. When

submerged in the water supply the cylinders at once fill by gravity through the foot valves R and R. The main valve mechanism, as shown in the detail, operates the slide valve A₂, and opens and exhausts at proper intervals the live air ports J and K. For instance, in starting the pump live air travels down through the air inlet S into the open port J and into the left hand cylinder, which is full of water. This compressed air forces the water, by displacement, down and out through the discharge O, up through the check valve P, and into the water main at Q. When the water has been forced from the left hand cylinder down to a level slightly above the opening O the bucket B, which is full of water, is supported only in a column of air, while the bucket in the opposite cylinder on the other end of the lever is immersed in water and therefore weighs almost nothing. The bucket in the left hand cylinder then becomes a dead weight, pulls down the rod and lever to which it is attached and operates the slide valve A, which throws live

water fittings. It will be appreciated that there is no possibility of the pump getting on dead center and that it is capable of handling the muddiest and grittiest water, as all valves, including the oscillating slide valve, never come in contact with the water. The absence of wear inside the cylinders is also to be noted, where there are no working parts except the buckets, and these do not touch or come in contact with the housings within which they operate. Long life is insured from the fact that the travel of the buckets is but 2 inches, travel of main slide valve 2 inches, auxiliary valve 1 inch and oscillating slide valve ½ inch per stroke. At the highest speed at which these pumps are operated this stroke does not take place over six times per minute.

An installation of such an equipment has been made for the water works system of the city of Hickory, N. C. With it the city is pumping its water supply from the South Fork River, at a distance of 3 miles from the power plant, which is located inside the city limits on the

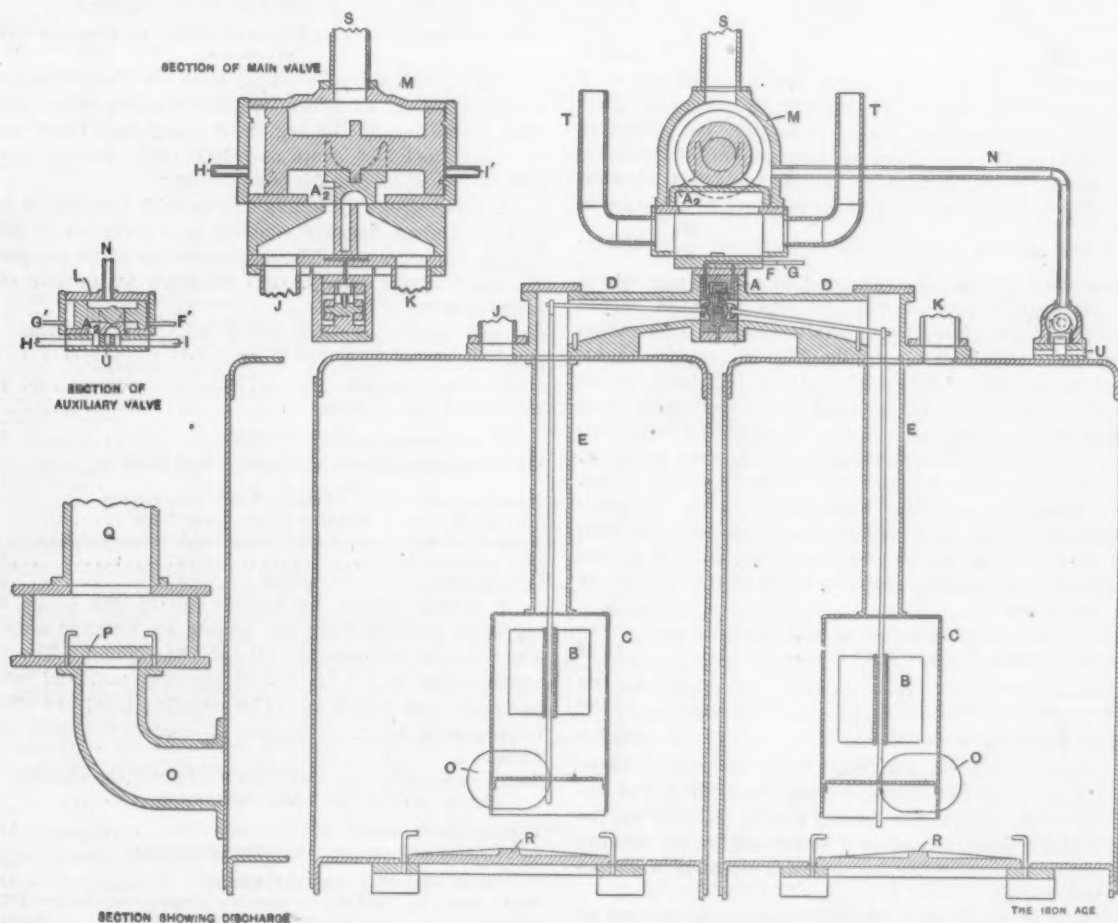


Fig. 2.—Section and Details of a No. 28 Latta-Martin Pump, Having 48 x 60 Inch Cylinders.

air through port F and F' to one end of the auxiliary piston L. At the same time A opens an exhaust port from the opposite end of auxiliary piston L through port G'. The piston L moves its slide valve, which throws live air through port I and I' to one end of the piston in the main valve M. At the same time it opens exhaust port H and H' from the opposite end of the main piston in M. The latter carries with it the slide valve A-2, which crosses the port J, and exhausts the compressed air, which has done its work in the left hand cylinder, and throws live air into the right hand cylinder through the port K, while the exhaust from the other cylinder passes out through the exhaust fittings T and T'. While air has been forcing water from the right hand cylinder the left hand cylinder has been exhausted and has become full of water by gravity through the foot valve R, the operation taking place alternately between each cylinder, giving a continuous flow of water.

Attention is called to the accessibility of the valve mechanism for repairs. By removing the bolts around the header on top of the cylinders, as shown in Fig. 1, the entire valve mechanism, together with housings and buckets, may be removed without disconnecting any

line of the railroad, using a 3-inch transmission line, and the displacement pump at the river forces back to the city a 10-inch stream of water against a total head of 320 feet. This installation gives one of the longest and most severe tests of transmitting air for pumping purposes that has ever been made. It has now been in operation for about a year and is giving most satisfactory results. By it the city has been able to eliminate establishing a pumping plant at the river and so save the cartage of fuel to that point and the necessity of keeping a machinist at the river. The water system is now arranged so that the subsiding and filter basins and clear water well are all located at the power plant inside the city limits, requiring only the services of one day man and one night man to run the entire plant.

The pneumatic displacement pumps are made by the Latta & Martin Pump Company, Hickory, N. C. The eight standard sizes range in capacity from 25 gallons per minute, under a pressure of 150 pounds, to 1500 gallons per minute at 90 pounds. The smallest has cylinders 14 inches in diameter by 36 inches high, and the largest 48 inches in diameter by 60 inches high. The pumps are made to order, for any capacity and any pressure.

Gas Power Economics.—II.*

With Special Reference to the Iron and Steel Industry.

BY F. E. JUNG, NEW YORK.

Comparison of Steam and Gas Blowing Engines.

From the region of cheap fuel (1000 cubic feet of gas cost 1.47 cents and 1000 pounds of steam cost 25.5 cents), I select two blast furnace blowing engines, working 360 days of 24 hours, or 8600 hours a year.

1. Horizontal gas blowing engine of 600 effective horse-power, maximum capacity at 80 revolutions per minute. The actual mean output throughout the year averages not more than 90 per cent. of the maximum capacity, or 540 effective horse-power. Fuel consumption per hour $540 \times 105.9 = 57,186$ cubic feet, having a value of $57,186 \times 1.47 = \$0.84$.

Hence annual fuel cost for 8,600 hours =\$7,200
Attendance, maintenance and repairs, actual cost..... 3,100

Total operating cost.....\$10,300

2. Vertical blowing compound engine, working at 5 atmospheres (73.5 pounds per square inch)† gauge pressure with condensation, and developing 450 effective horse-power at 45 revolutions per minute, and at full load. To facilitate a comparison it is assumed that blowing engine No. 2 be so constructed as to develop at 60 revolutions per minute a maximum capacity of $\frac{60}{45} \times 450$ or 600 effective horse-power. The cost of attendance, which at 45 revolutions per minute amounts to \$1130, would remain the same, but the expenditures for lubrication and upkeep, which are actually \$754.08, would be increased in a ratio of 60 to 45, that is, to \$1000, which gives a total of \$2130. On account of the low steam pressure and the small stroke volume, the engine works with a later cut-off than that developing the highest economy. Hence, the net steam consumption is found to be 9.5 kg. (20.9 pounds) per effective horse-power hour. In addition there is 1 kg. (2.2 pounds) per hour for pipe loss, which gives a total of 23 pounds. Now, taking as the average annual output 540 effective horse-power as above, we have

Steam consumption per hour, $540 \times 23 = 1,242$ pounds,
having a value of $1,242 \times 25.5 = \dots\dots\dots \3.17
8,600 hours a year =\$27,200
Attendance and upkeep..... 2,100

Total operating cost.....\$29,300

or in round numbers, \$30,000, which is almost three times larger than the corresponding item for a gas engine. In other words, the annual saving effected by the use of a gas engine instead of a steam engine for driving one blowing engine of 540 horse-power actually amounts to \$19,000 a year.

To show that the result is not incidentally arrived at or is an exception I give another comparison derived from the district characterized by expensive fuel (1000 pounds of steam cost 32.03 cents and 1000 cubic feet of gas cost 1.89 cents).

3. Horizontal gas blowing engine for blast furnace work, single acting old type, having a gas consumption of 3 cubic meters (105.9 cubic feet) per effective horse-power hour, and delivering 600 horse-power nominal at from 60 to 80 revolutions per minute. The average annual output at from 71 to 72 revolutions per minute is 450 effective horse-power. In 416 working days three of the above engines have consumed for attendance, lubrication and maintenance, including repairs, together \$4854; for 360 working days of 24 hours, or 8600 working hours annually, one engine requires \$4190.

Gas consumption per hour, $450 \times 105.9 = 47,655$ cubic feet, having a value of $47,655 \times 1.89 = \dots\dots\dots \0.90

8,600 hours a year =\$7,700
Attendance and upkeep..... 4,190

Total cost of operation annually.....\$11,890

4. Vertical blowing compound condensing steam engine with wide expansion but low gauge pressure (5 at-

mospheres = 73.5 pounds per square inch). The blowing engine has 450 effective horse-power nominal capacity, and the actual output at 45 revolutions per minute, and air delivered at from 0.35 to 0.37 atmosphere pressure, is also 450 horse-power. Owing to the slow speed and the low steam pressure the net steam consumption is found to be 9 kg. (19.8 pounds) net, or, including losses in steam pipes, 10 kg. (22 pounds) total per effective horse-power hour.

Steam consumption per hour, $450 \times 22 = 9,900$ pounds,
having a value of $32.3 \times 9.9 = \dots\dots\dots \3.20
8,600 hours per year.....\$27,520
Attendance and upkeep..... 2,480

Total operating cost per year.....\$30,000

Even the employment of an old type single acting gas engine effects a saving over the steam engine of \$18,000. It is remarkable that the results of the comparison between Nos. 1 and 2 and Nos. 3 and 4, respectively, come out so close, though the types of engines, the local conditions and the cost of fuel are quite different.

Comparison of Gas and Steam Drive in Electric Central Stations.

Taking the actual working time for the prime movers as 300 days of 24 hours, or 7200 working hours per annum, there are, in the region of cheap fuel (1000 pounds of steam cost 25.5 cents and 1000 cubic feet of gas cost 1.47 cents) available for comparison:

5. Four-stroke cycle gas engine with two single acting twin cylinders directly coupled to a dynamo of 350 effective horse-power. The engine works at 90 per cent. of its maximum capacity, that is, with an output of 315 horse-power.

Gas consumption per hour, $315 \times 105.9 = 33,350$ cubic feet, having a value of $33.35 \times 1.47 = \dots\dots\dots \0.49
7,200 hours annually.....\$3,520
Attendance and upkeep..... 1,540

Total operating cost per year.....\$5,060

Or based on 1 effective horse-power hour:

	Cents.
Operating cost for 1 effective horse-power hour.....	0.223
Cost of gas for 1 effective horse-power hour.....	0.155
Attendance and upkeep for 1 effective horse-power hour..	0.068
Gas cost per hour.....	48.8
Cost of attendance and upkeep per hour.....	21.4

6. Steam turbine, 150 pounds square inch gauge, working with condensation and having an average output of 400 effective horse-power all the year round. The steam consumption is 7.2 kg. (15.84 pounds) net, and with 10 per cent. pipe loss 8 kg. (17.6 pounds) total per effective horse-power hour. The cost of operation comes out as follows:

Steam consumption per hour, $400 \times 17.6 = 7,040$ pounds,
having a value of $25.5 \times 7.04 = \dots\dots\dots \1.79
7,200 hours a year.....\$12,800
Attendance and upkeep, including condenser..... 1,200

Total operating cost per annum.....\$14,000
Total operating cost per 1 effective horse-power hour.0.487 cent.
Cost of steam per 1 effective horse-power hour.....0.447 cent.
Attendance and upkeep per 1 effective horse-power hour.....0.042 cent.
Operating cost per hour for steam.....\$1.78
Attendance and upkeep per hour.....16.8 cents.

Comparing Nos. 5 and 6, under the assumption that the cost of operation increases in direct proportion to the ratio of capacities, namely, 315 to 400, the total operating expenses per annum of a gas dynamo of 400 horse-power would be \$6400, and the annual surplus cost of the turbo-dynamo of the same output would then be \$7600.

Rolling Mill Engines.

In conclusion, I give the results obtained with a large blast furnace gas engine of modern type, built by the Nuernberg Company in Germany. The engine, which on the average works with its nominal load, 1850 effective horse-power, serves to drive a rolling mill and is at work 300 days of 11 hours, that is, 3300 working hours per year. The cost of operation comes out as follows:

Gas consumption per hour, $98.8 \times 1,852 = 182,780$ cubic feet, having a value of $1.47 \times 182.78 = \dots\dots\dots \2.68
3,300 hours per year.....\$8,840
Attendance and upkeep..... 2,680

Total operating cost per year.....\$11,500
Total operating cost per 1 effective horse-power hour.0.188 cent.
Gas cost per 1 effective horse-power hour.....0.144 cent.
Attendance and upkeep.....0.043 cent.

* Continued from page 1392 in the issue for April 26, 1906.

† The pressure used in this plant is very low, but no other engine was available for comparison.

In studying these results, it becomes at once apparent how much more economical the employment of double acting tandem engines of modern construction is over what can be obtained with the old type single acting machines, though even with them an enormous saving over the steam equipment has actually been effected. In the accompanying diagrams I give a tabulation of the average cost of gas and steam per 1 effective horse-power hour for power generation, compared on the basis of varying coal prices in different localities, the coal having a thermal value of 11,700 British thermal units per pound, and blast furnace gas having a calorific value of 100 British thermal units per cubic foot.

1 ton of coal costs.....	\$2.66	\$3.14	\$3.63
1,000 pounds steam cost.....	.255	.289	.323
1,000 cubic feet gas cost.....	.0147	.0166	.0189

The fact must not be overlooked that the above calculations are based on foreign conditions and cannot be used for direct comparison with the corresponding items which for the same plant capacity would obtain in this country. This, however, would not affect their relative value in the least.

In the accompanying diagrams the plotted lines in Fig. 1 show the cost of steam and in Fig. 2 the cost of blast

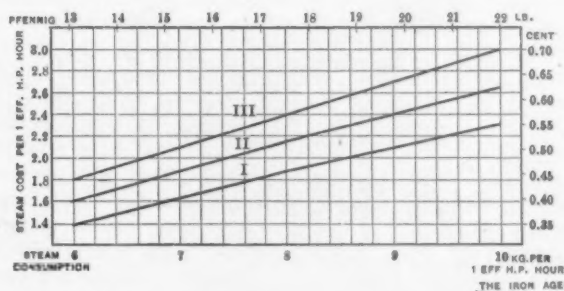


Fig. 1.—Cost of Steam for 1 Effective Horse-Power Hour in Various Localities.

furnace gas per 1 effective horse-power hour in various localities and for various coal prices and loads. Fig. 3 gives the gas consumption of blast furnace engines per 1 effective horse-power hour at various loads.

In view of these facts, is there any justification for the reluctant attitude which some over conservative iron masters still feel called upon to maintain? Let us briefly summarize and examine the well worn objections which people not familiar with foreign achievements still believe to be deserving of serious discussion.

Objections Summarized.

Geographical Difficulties.—There are localities in the lake district and elsewhere which are unrivaled as to abundance, accessibility and value of minerals and ores,

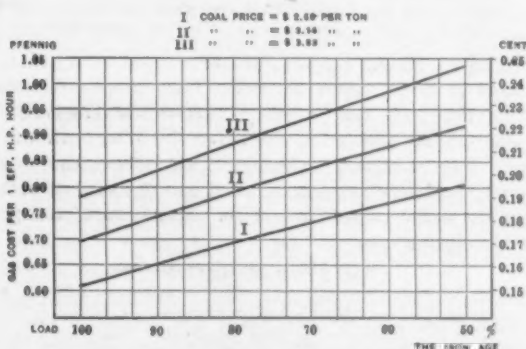


Fig. 2.—Cost of Blast Furnace Gas for 1 Effective Horse-Power Hour in Various Localities.

and which lend themselves more readily to modern methods of power generation and distribution than does any part of Germany.

Backward State of Gas Engine Industry.—There are some types of large gas engines built by up to date manufacturers in this country which in practical excellence, reliability and steadiness of running come up to the most exacting requirements and can be relied upon as giving

cheap and continuous service under all the varying conditions of heavy service. Moreover, it is only a matter of logical reasoning to expect that the same process of evolution, which has gradually forced upon every progressive steam engine builder in Germany the necessity to take up the subject of gas engine manufacture so as to be able to comply with the modern requirements for economy, will similarly affect the large American concerns, and, with that spontaneousness of growth and progress so remarkable to this country will lead to a national effort to create the best also in this line of machine building.

Higher Initial Capital Outlay.—The present excess cost of a gas plant over a steam plant is too insignificant

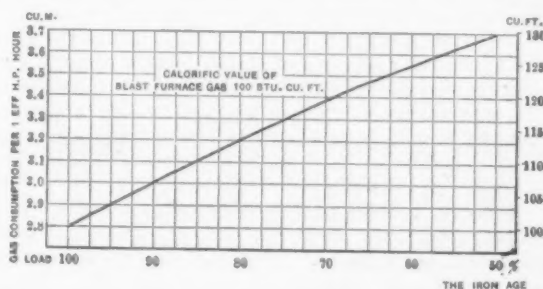


Fig. 3.—Gas Consumption of Average Blast Furnace Gas Engine for 1 Effective Horse-Power Hour at Various Loads.

to warrant any hesitation, the price per horse-power in gas engines being from \$35 to \$40. The larger the plant, the more the two items are even now brought to a parity. Let the power consuming people disclose their interest in the gas problem and the rising demand for the increased manufacture of and the competition in this type of engines will at once lower their price below that of their competitor, as has been evidenced in Europe.

Cost of Attendance and Upkeep.—With the modern large gas engine of the Nuernberg type, which has become the standard construction for large four-cycle work, and for which accurate data are given in the last paragraph, the actual cost for attendance and upkeep per 1 effective horse-power per hour of an 1800 horse-power engine is equal to the corresponding item of a 400 horse-power steam turbine. This, in the first place, is due to the elimination of that inefficient, wasteful, space, labor, water and fuel consuming boiler equipment. The blast furnace, as the potential source of energy, combines in itself in a most simple and efficient manner both the processes of reducing the ore and generating the power necessary for carrying out the entire series of converting and finishing processes which transform the original ore into marketable steel products.

Floor Space and Other Items of Comparison.—As has been said, the boiler house is eliminated completely, and there is substituted for it the gas cleaning plant, consisting of a few electrically driven high speed centrifugal fans, which occupy very little room, consume almost no water, and absorb only from 1 to 1.5 per cent. of the power developed in the engines. They are self cleaning, requiring hardly any attention. This factor of efficiency of modern gas cleaning methods is another point often overlooked by those who have not followed the course of development on the Continent. Another no less important point is the much lower consumption of water in a gas power as compared with a steam plant, which in some localities may become a decisive factor in favor of the first named.

If, therefore, the surplus power that becomes available by the adoption of economical prime movers can be used in the works, where its value is equal to the corresponding reduction of the coal bill, or if it can be sold to advantage abroad, where its value varies with the local conditions, we shall invariably select the gas engine as a prime mover for central stations. Where there is no demand or market for available surplus power, there the steam turbine will always keep its field of usefulness.

As a further outcome of these investigations the fundamental fact—obvious, though often lost sight of by technical prophets—is re-established, that when predict-

ing the course of future relations of power producing methods no sweeping statement must be attempted or accepted. The selection of prime movers must be decided with due consideration of the local conditions by determining, for the different types of engines and modes of action, through careful mathematical analysis, the complete commercial economy co-efficient separately for each individual case.

Conclusion.

If the above contribution to the subject of power plant economics would help to arouse the general public interest in the possibilities of gas power application, thereby benefiting the greater part of American industry, one purpose of this contribution will have been accomplished. The facts presented should reach the executive heads of the iron industry, who, to my knowledge, are responsible for the backward condition of things in this country and who are the one powerful body which may be appealed to and is able to grant. Their interest in and appreciation of the economic attainments effected abroad must be awakened. Then the advocates of gas power will have secured the one thing that is needed, namely, a fair opportunity for proving its merits on American soil. For what can enthusiasm, what can learning, what can conviction do in this fight for efficiencies, unless founded on their approval and aided by their consent? And what art, machine or method is there, though excelling all else in superior attainments, that could find an even limited field of usefulness in this country without their sanction and co-operation?

(Concluded.)

New Business in Canada.

A Large Steel Rail Order.

TORONTO, April 26, 1906.—The National Transcontinental Railway Commission is on the market for 50,000 tons of 80-pound rails. A call for bids is to be issued this week. The business of placing this order follows the awarding of construction contracts for two sections of the Eastern Division of the National Transcontinental Railway. The sections in question are that between Quebec and La Tuque, 150 miles long, and that between Lake Superior Junction and Winnipeg, 245 miles long. It is the intention to have the section between Lake Superior Junction and Winnipeg finished in time for the crop movement of next year. By that time, it is confidently stated, the sections of the Grand Trunk Pacific, now under contract west of Winnipeg and its branch line from Lake Superior Junction to Fort William, will be ready. If so, the Government section must be ready then as well; otherwise there will be a gap of 245 miles in the continuous system. For the section from Quebec to La Tuque there is not the same necessity for haste. At all events the order as a whole is not one for very early delivery. Along with it will go an order for 2500 tons of angle bars.

As the steel will not be required this season there is a possibility that the Canadian mills may be able to execute the order, notwithstanding that they have business booked that will take all their output for several months ahead. Both the selling agent of the Lake Superior Corporation and the Dominion Iron & Steel Company, have intimated their purpose to bid for the order. British mills are reported to be taking an interest in the business. They have a tariff advantage of one-third over the United States makers. The question of duty is an important one. The Tariff Act provides that articles imported by or for the use of the Dominion Government are to be admitted free of duty. The Eastern Division of the National Transcontinental Railway is a Dominion Government road, and, ordinarily, the rails for it, imported by the Dominion Government directly by commissioners of that Government, should be exempt from duty. Rails and equipment for that other road of the Federal Government, the Intercolonial, are so exempt. But there is a provision in the National Transcontinental Railway Act covering this point. Section 33 of that act is as follows:

Nothing in this act shall be construed to entitle any person to exemption from the payment of customs duties on any goods imported into Canada; and it is hereby declared that the expres-

sion, "direct importations of material or supplies by the Government," in clause 17 of the agreement, has reference only to such importations by the Government for the purposes of betterments of the Eastern Division for which money is expended by the Government upon capital account under clause 16 of the agreement. Material or supplies otherwise required for or entering into the construction or betterment of the said railroad were not intended to be, and shall not be, exempt from the customs duties ordinarily payable upon imported material or supplies of the same class; and the customs duties thereon, when they are imported, shall be included in estimating the cost of construction or the capital of construction account under the agreement.

Besides the rails and angle bars required on these sections, there is the steel for the 3000-foot viaduct at Cape Rouge. The contract for this went to the second of the two bids put in by the Dominion Bridge Company, that bid being for \$318,000. The bids for this bridge were as follows: Grand Trunk Pacific, \$347,000; Phoenix Bridge Company, \$348,000; Locomotive & Machine Company of Montreal, Limited, \$331,000; Dominion Bridge Company (1), \$329,000; Dominion Bridge Company (2), \$318,000; Canadian Bridge Company, \$343,000.

Increasing Capacity.

There is a strong probability that the output of existing Canadian steel works will be increased as to output of rails as well as to general output. According to an announcement made some time ago by President Warren of the Lake Superior Corporation, two new open hearth furnaces will be added to the plant at Sault Ste. Marie before the summer is over. The company has lately taken up the \$2,000,000 bonds guaranteed by the Ontario Government, thereby releasing a mass of securities of many times that face value, securities that have greatly appreciated since they were pledged. This adds to the financial resources of the corporation and facilitates new capital operations of the kind projected. It is understood that the rail output of the Sault mills is sold as far ahead as next October. So far nothing has been given out as to additions to the capacity of the rail plant itself, but if it is kept in material by the increased open hearth output, doubtless the rail product will be much augmented.

The Sydney Post states that the Dominion Iron & Steel Company has laid the foundations for two heating furnaces, which when finished will make six in all, an addition which will give a great impetus to the general work of handling the raw product before being converted into rails. The new furnaces are to be in many ways far superior to those which are at present in operation. The maximum number of blooms which can be heated in the old furnaces filled to their capacity is but eight, while the new ones, although not taking up much more space will hold 28. The working of this new addition will necessarily mean that the output of the rail mill will be largely increased.

The capitalists who control the Canada Foundry Company of this city, and the Canadian General Electric Company to which it is subsidiary, and the Electrical Development Company of Ontario, whose power works are far advanced at Niagara Falls, are organized to build blast furnaces in the Niagara district. They propose to manufacture pig iron for foundry purposes exclusively. A furnace of 200 tons daily capacity is to be built at the outset. The Canadian Shipbuilding Company, whose works are at Bridgeburg, is another corporation belonging to the same cluster, all being consumers of the products of foundry iron.

The Iron Bounties.

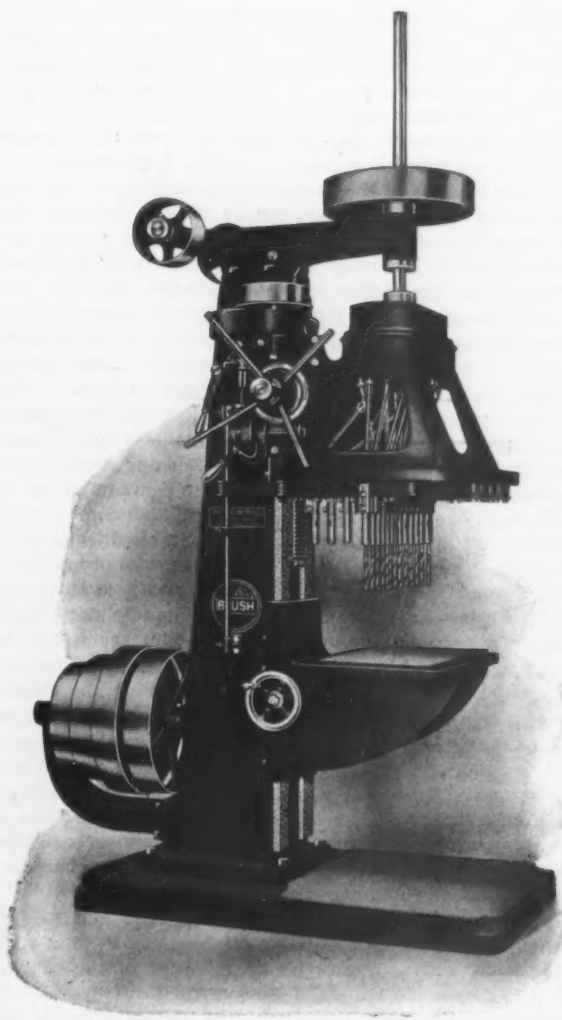
James Connell, one of the Government supporters in the House of Commons, and probably the most influential of the representatives of New Ontario in that House, has given notice of a resolution to confine iron and steel bounties to the product of Canadian and Newfoundland ore.

C. A. C. J.

Sini, in Western Bengal, India, is to have rolling mills and blast furnaces with an annual capacity of 120,000 tons of pig iron and 70,000 tons of steel. A railroad 50 miles in length, to connect the works with the Gurumashini iron ore field, will be built by the Indian Government. It is expected that the works will be completed in about two years.

The Baush No. 10 Multi-Spindle Drill.

Under modern methods of manufacture, where accuracy must be combined with rapidity of production, the multi-spindle drill has become a practically necessary part of the equipment of many machine shops. The machine illustrated carries the system of specialization to the rapid drilling of automobile crank cases, cylinders, pumps and similar parts, and to electrical slate work. The capacity of the machine is 16 3-16 to 1/2 inch holes in cast iron or steel. It will drill 16 1/2-inch holes in cast iron, 1 inch deep, in 20 seconds. Either high speed or carbon drills may be used, a two-speed countershaft being provided for that purpose. The machine is capable of drilling on a circle, square, or any irregular layout within the capacity of the head. The capacity of the rectangular head is 16 by 20 inches, and circular heads



The No. 10 Adjustable Multi-Spindle Drill Built by the Baush Machine Tool Company, Springfield, Mass.

are made with a capacity up to 16 inches diameter. The least distance from center to center of spindles is 1 1/2 inches. The machine is built by the Baush Machine Tool Company, Springfield, Mass., and is known as the No. 10 adjustable multi-spindle drill.

The head carrying the drill spindles is counterbalanced and is raised and lowered by rack and pinion, its vertical travel being 24 inches. Three gear feed changes are obtained by shifting a spring key controlled by a small hand lever, seen on the side of the machine. Power feed is obtained by throwing in a tooth clutch connecting with the worm wheel on the pinion shaft. The clutch has an automatic trip to disengage it and permit the machine to run without feeding. A quick return through the rack and pinion is accomplished by hand in the usual fashion. One turn of the hand wheel withdraws the drills from the work.

The spindles are of tool steel, running in composition bearings, with the thrust taken by ball bearings. For

each spindle a vertical adjustment of 13-16 inch is possible. The mechanism of the spindles is the same as that of the Baush standard type of multi-spindle drills. The adjustable table on the post is raised and lowered by a hand wheel operating a rack worm. The table is 18 x 24 inches and has a vertical movement of 16 inches. The base of the machine is planed so that when long work is to be drilled the adjustable table can be removed from the post and the work placed on the base.

All bearings are composition lined and all shafts and spindles are ground. The countershaft brackets have babbitted bearings with ring oilers. The speeds of the countershaft are 450 and 500 revolutions per minute. The machine occupies a floor space of about 67 x 40 inches and weighs, with the countershaft, 3600 pounds.

Customs Decisions.

Copper Plates.

The Board of United States General Appraisers April 28 sustained a claim made by J. Marsching & Co., New York, and held that copper plates used in printing pottery are not subject to the rate of 45 per cent. as manufactures of metal. It appeared from the testimony that before being put to their ultimate use the plates are engraved, then rolled and the edges filed smooth. The collector took the view that the work done on the plates constituted them manufactures within the meaning of the tariff law. General Appraiser Fischer, in his decision written for the board, says, however, that the labor expended on the plates does not constitute a process of manufacture or result in anything other than copper in plates, which are specifically provided for in paragraph 532. The board reverses the collector and grants the claim of the importer for free entry.

Flexible Iron Tubing.

It has been determined by the Board of Appraisers that lengths of flexible galvanized iron tubing with rubber attachments are not liable to a 45 per cent. duty as manufactures of metal, but come within the tariff provision for iron tubing, with assessment at the rate of 2 cents per pound. The tubing is fitted with rubber nipples at each end, the nipples being secured to the tubing by metal bands. The board sustains the claim of the importer, the Washington Rubber Company, and expresses the opinion that the fitting of the rubber nipples on the tubes did not remove them from the classification for tubing.

Steel Watch Chains.

The customs court has denied a contention raised by A. Strauss & Co. regarding the classification of steel watch chains, which the customs authorities taxed at 45 per cent. Several claims were made for lower duty, the chief one being that the merchandise should be deemed toys, which classification carries an assessment of 35 per cent. At the hearings much testimony and some representative samples of the goods were admitted. The importers insisted that the chains were commercially recognized as toys, while a number of domestic manufacturers testified that the chains are used by adults in the carrying of cheap watches.

The use of compressed air for cleaving granite has recently been adopted by the North Carolina Granite Corporation, Mt. Airy, N. C. The granite in this company's quarry is such that no ledges or bed planes exist in the stone, thus allowing it to be split in a straight line in almost any direction. The ease with which the granite is split affords a most economical means of working the quarry. By the combined use of powder and compressed air large sheets or laminations of granite are separated from the hill on which the quarry is situated.

The William P. Snyder, the new ore vessel built by the Great Lakes Engineering Works for the Shenango Furnace Company, Pittsburgh, has gone into service. Mr. Snyder and a party of friends are now making a trip through the ore regions and will board the new boat at Duluth for a trip to Detroit.

Engineering Works on the Pacific Coast.

Factors in Their Special Problem.

Some of the questions now under consideration in San Francisco give timeliness to an address by George W. Dickle, then president of the Technical Society of the Pacific Coast, before the Pacific Coast Engineering Congress, at Portland, Ore., June 29, 1905. Mr. Dickle has been well known for a number of years as general manager of the Union Iron Works. We present liberal extracts from the address in the following, taken from the February, 1906, number of the *Journal of the Association of Engineering Societies*:

The physical problems that have to be encountered by the engineer in his efforts to bring the vast territory known as the Pacific Coast into the best productive condition, and to render it a desirable and comfortable place to live in, are peculiar to this side of the continent. The conformation of the face of the country, the character of the rock strata, the extreme condition of wetness in one locality and a similar condition of dryness in another locality, with a sparse population that limits the possible expenditure, are problems that our engineers have struggled with during the last 50 years, and they will be with us for 50 years to come. The problems I wish to bring before you at this time are not those of a physical character, but are those that may be said to come within the department of economics. By engineering and kindred industries I mean all establishments whose business involves constructive engineering in all its branches; this includes all manufactures in metals, although not strictly engineering. In all this class of industrial products labor forms a large percentage of the total cost of production; and in order to reduce costs to the lowest possible point manufacturing establishments must confine themselves to a certain line of output, perfect that line, both in design and in method of production, having special tools for each stage in the process of manufacture. To make this possible a large market is necessary for each kind of product. These conditions, so necessary to successful production of the numerous and varied mechanical devices required to carry on our modern civilization, are not yet present on the Pacific Coast. Gradually they will come with population, but we are yet very far from the conditions that will make industrial engineering an assured success among us.

Changes Wrought by Machinery Agencies.

In many respects the general engineering establishment on the Pacific Coast was better off, as regards the certainty of business, 30 years ago than it is to-day. At that time the agent or representative of the manufacturer of machinery in the more densely populated parts of the country had not yet established himself on the Pacific Coast, and whatever machinery was required here for mines, saw mills, flour mills, steamboats, street railroads, &c., was built to order by some local engineering establishment on the best terms his customer could make with him, and usually for some special type of machinery suited to the requirements of the case. Thus in some cases the best type of machinery for certain purposes originated on this coast, and some notable examples of bold engineering were carried out successfully that engineers in more settled communities would not have dared to undertake. Yet this very originality of engineering conception rendered the establishments that carried out such projects quite unfit to undertake the manufacture of machinery on economical lines.

As soon, however, as the amount of machinery required on the Pacific Coast was sufficient in volume to attract the notice of manufacturers of special types of mechanism for various purposes, representative agencies were established in the centers nearest to where the bulk of such machinery was required, and the agent representing, as he usually does, many manufacturing establishments and being well furnished with plans, illustrations and specifications of the machinery he can furnish, is in a much better position to secure the general run of work of this character than the local establishments that have nothing that they manufacture to meet any general

demand, but build some special machines to meet as far as they can the special needs of their customers. And herein lies the problem that the local establishment must solve or fail to reach permanent success. The agent representing several large manufacturing establishments, whose markets cover the needs of the whole country and who make some special standard type of machinery well designed to meet the general requirements, has only to persuade his prospective customer that generally the machine he offers is the best adapted to the purpose in view, and that it will be for his interest to modify any special condition in his case in order to use the standard types. This reasoning promising, as it usually does, a saving in outlay, has a pretty good chance to succeed.

The Chance for Local Engineering Works.

The local engineering establishment has but one chance, and that is to persuade its prospective customer that the special conditions of his case cannot be ignored or changed without risking the success of his enterprise, that the machine that will entirely meet all his requirements successfully cannot be secured from the stock of any manufacturing establishment, but must be specially designed to meet his special conditions, and that though it costs considerably more, yet in the long run it will prove the best for him. Though the reasoning of the local engineer is not always true, for he tries to magnify the one condition as much as possible, it is still a fact that the prospective customer seldom gives proper value to the condition demanding special treatment, but takes the easiest course, the one requiring no study of conditions, examination into special plans, &c., and is inclined to accept the standard machine that can be delivered quickly and which he can actually see before he buys. Thus the local engineer is outdone by the local representative of a distant manufacturer, and the business that should support local establishments, increasing our wealth and population, goes away to enrich other communities.

If a Pacific Coast engineering establishment has to compete with an Eastern establishment on an engineering proposition instead of a manufacturing proposition, even though freight and wages be heavily against the Pacific Coast engineer, his ability to handle new problems as they come to him will enable him practically to hold his own in the fight. This has been very forcibly illustrated in the building of naval vessels on the Pacific Coast. One concern has kept on building war ships at San Francisco, and has evidently done as good work and with as good results in the way of profit as any of the Eastern establishments with which it has been in competition. This goes far to prove that for work that is not simply repetition the Pacific Coast engineer can and does hold his own against work of a similar character produced on the Atlantic Coast.

How then is he going to adapt himself and his establishment so as to keep that establishment going with full power, with a large part of his work of the character that forms the standard work turned out by Eastern manufacturing establishments? He cannot hope to extend his market beyond the limits of the Pacific Coast under the conditions in force here, and on that account cannot manufacture in the same sense that his Eastern competitor does. He has some advantages, however, that count in his favor. The cost of maintaining agencies and commission on selling the standard manufactured machinery is probably not less than 25 per cent. of the total cost, and this should help the local engineering establishment; but as things are usually managed this advantage is not nearly enough for the local concern and may be entirely eliminated by the manufacturer, whose market, extending over the whole country, gives him the chance to sell cheaply at any place where the local establishment tries to sell the same class of machinery.

A Field for Electrical Works.

The prospect, in California especially, has brightened somewhat of late, owing to the discovery of great subterranean stores of liquid fuel, which generally means a saving of 50 per cent. in the fuel bills of an engineering establishment; besides, it makes enterprises, such as electric generation for lighting and power purposes, pos-

sible that would not otherwise have been attempted, thus creating new fields for the engineering talent and the constructive ability of the country to work in. A good deal of this new field, that of the cheap generation of electricity, either through the burning of liquid fuel that comes from below or the falling of a purer liquid from the mountains, is, I am sorry to say, not being cultivated by the local engineering works as it might be. I believe there is a splendid opportunity at the present time to establish somewhere on the Pacific Coast a great electrical establishment which would turn out complete electrical generating plants, operated either by steam engines, water motors or steam turbines. The field for this class of work on the Pacific Coast is a large one now and will grow steadily until it becomes one of our greatest industries. I have had some experience in the building of electrical generating plants on the Pacific Coast, the work being done in connection with a much larger output of general engineering work; and under these conditions I found it quite possible to build at a cost never greater than the selling price of similar work manufactured in Eastern establishments as standard work. This leads me to believe that an establishment devoting its undivided attention to supplying the needs of the Pacific Coast in electrical engineering could build up a splendid and profitable business, combining well designed generators and equally well designed engines or water wheels, and taking in also all the engineering accessories that form part of any completed electrical generating plant. The principal factor in such an enterprise would be the cost of labor. As this item will be between 50 and 60 per cent. of the total cost of production its regulation will always be of the utmost importance.

The rate of wages by the present system of compensating labor will, I think, be always higher on the Pacific Coast than it is elsewhere. Perhaps no other reason can be given for this condition than that it is so and is likely to be so indefinitely. But while the rate of wages is higher here I do not think that the amount of wages paid for a given result need or should be higher here than it is elsewhere. I have for some years back been advocating a system of compensation for the labor in such establishments, whereby the men as a whole who are to do the work should contract with the owners of the establishment in which they work for the whole labor involved in producing a certain industrial result. This would enable the workmen to decide whether they could afford to do the labor part involved in producing certain kinds of machinery for such an amount as would make it possible for the establishment in which they work to undertake the production of such machinery.

The Labor Factor Foremost.

There are four factors that go to make up all estimates of cost in the class of industrial products we are now considering. These are: 1. The prime cost of all the materials required for the proposed work to be done. 2. The actual cost of all labor necessary to convert the materials into the finished result ready for delivery to or acceptance by the customer for whom the work is done. 3. The proportion of the general expense account chargeable on such estimate. 4. Profit. In engineering estimates the labor item will be from 40 to 60 per cent. of the total amount. Very few workmen believe this; in fact I have generally found them under the impression that the profit was from 40 to 60 per cent. An average proportion for general machinery estimates would be:

	Per cent.
Labor	40
Material	40
General expenses	12
Possible profit	8

With this proportion, which may be taken as roughly correct, an increase of 20 per cent. in the cost of labor would completely wipe out the item of profit.

Workmen's Participation in Engineering Estimates.

Suppose, then, that our engineering establishment agreed with all the men employed in the works that the amount set aside for labor in any estimate should be accepted by the men employed as a whole as the compensation they should receive for performing all the labor

required to complete the work represented by that estimate. All the men employed in that case would have to be represented by a committee of themselves, say, one from each department of the works, who would go over the estimate of labor with the representative of the works who made the estimate, and accept, if satisfactory, on behalf of the men they represent. This might be done before the tendering for the work, so that the workmen themselves would be tendering for the labor part of the proposed contract. The question might be raised here as to the ability of those representing the men to determine as to the correctness of any estimate for labor; whether the employer has all the skill and experience necessary to make his estimate of labor, while the representatives of the men do not as a rule possess this skill, and whether the men would therefore be at the mercy of the employer. There need be no fear of this difficulty, as the men are not likely to appoint representatives who are not thoroughly competent to watch their interests; in fact, as already stated, the men are apt to place a lower estimate on the value of labor than the employer. The employer, as at present, would ultimately have to stand the chance of possible loss, but that chance would be very much less than it is at present, as the possible gain by the workmen would be an incentive to every one to do his best.

Under such an arrangement I would propose to engage all the men just as they are employed under the present system, the foreman rating every man at what he considered him worth per day. Or to meet the altruistic ideas now prevailing among the trades union men a uniform rate could be decided upon for all the tradesmen. Rates also would be fixed for apprentices learning trades and rates for laborers. Each man's or boy's rating would be posted up in the department in which he worked, and his fellow workmen through their committee should have the right to have this rate reduced if they found that the work he turned out was not equal to his rating. All wages would be paid as at present, according to the rating. The full amount for which the men had contracted to do the whole labor on any job would be placed to the credit of labor on that job, and the wages paid out on that job would be charged against that account. As each job or contract was finished the unexpended amount on that particular job or contract, if any, would then be credited to the labor surplus account. If on any job or contract the wages paid should be more than the amount accepted for labor the difference would be charged to the labor surplus account. At the end of each year the amount that had accumulated in the labor surplus account would be available as a dividend on labor, and whatever percentage it formed of the total amount paid for labor during the year would be the percentage each man would receive on the amount he had earned during the year.

Present Labor Methods Mean Ruin.

I fully understand that such a system of compensation to workmen as I have outlined presents difficulties of a special character in every kind of business. I have studied it very carefully in its application to an engineering business and have reached the conclusion that some such plan as I propose will be ultimately accepted by both employer and employed as the only solution of the labor problem, as it affects industrial engineering. Courage and honesty combined with the right kind of skill on the part of those managing such concerns would, if patiently applied, result in such benefits to workmen and to those with whom they work as would save many an industry on this coast, which under the present unjust methods of dealing with labor problems has nothing before it but impending ruin. I have dwelt thus long on the labor problem as it affects the possibility of constructing here on this coast the great bulk of the machinery required in the development of our resources, because it is after all the great and only hard problem that confronts us. Give labor the place that its importance demands in the councils of men. It is 40 per cent. of the problem of operating successfully any engineering establishment and should have its say in regard to that 40 per cent. if admitted to council. Labor unions would soon lose themselves in labor associations represented by directors of their own choosing, who would be a 40 per

factor in every estimate that was made, and who would be able to give and take with the other 60 per cent. in order to meet the conditions of market values. If the manager of an engineering establishment could meet the representatives of the workmen when making up his estimate for work to be done, and settle with them the cost of the labor part of the estimate, just as he meets the steel manufacturer and settles with him the cost of the part that he is to furnish, then mutual concessions that might be necessary in order to prevent the work from going elsewhere could be made without the feeling that either party was trying to get an advantage over the other.

The Coast Must Do More of Its Own Work.

The Pacific Coast will make slow progress in the mechanical arts until conditions are such as will enable us to do much more of our own work than we are now doing. What is usually termed "business management" is also a factor in the success of any engineering industrial enterprise. The ability to make something well and economically must be combined with the ability to sell it to the best advantage and in the nearest market; these two qualities are not often found in the same individual in their highest development. Still, a good engineer should also be a good business man. Both of these faculties need common sense and the habit of thinking clearly, backed by an educated judgment. Of these two requisites, however, the engineering business is most dependent upon the ability to make the proper thing for the work in hand at a price that will enable it to enter the market and compete successfully. In other industries the business faculty is the dominating factor in success. In some industries the cost of manufacture is but a small percentage of the cost of the finished product; in such cases business management in buying the raw material at the one end and in selling the finished product at the other end of the completed transaction is of vital importance.

Take the sugar refining industry, that may be said to have succeeded on the Pacific Coast. The cost of refining sugar in a first-class modern refinery is less than $\frac{1}{2}$ cent per pound, while the fluctuations in the price of raw sugar and of the refined product may be many times the total cost of refining in the course of a year or two. In such cases success depends chiefly on the business management. But in the engineering industries the purchased raw material does not cost more than about 40 per cent. of the value of the finished product; hence, the importance of shop economy where the other 60 per cent. is expended. The problem for the engineer to solve is, How can I, on the Pacific Coast, with all the elements that go to make up that 60 per cent. costing more than anywhere else, bring about a final result such as will enable me to sell my product at a price that will not be greater than the product of another establishment so situated that the elements that go to make their 60 per cent. cost less than they do here? It is just the industries whose problems are so hard to settle that are of most importance in the development and building up of the Pacific Coast. The volume of business done is not always a true measure of the prosperity of a State. The kind of business done is often of more importance than the amount. An agent selling \$100,000 worth of machinery on the Pacific Coast and receiving 10 per cent. commission can only distribute \$10,000 in the community out of the \$100,000 spent, while if the same machinery had been made here, \$60,000 would have been distributed in the community out of the \$100,000 spent.

Sugar Refineries and Engineering Works.

Compare the business of sugar refining, already mentioned as having succeeded on the Pacific Coast, with an engineering business which I will suppose to be also successful:

The refiner buys raw sugar to the extent of.....	\$5,000,000
Cost of refining.....	187,500

Total cost of product ready for the market.....	\$5,187,500
The refiner sells this product at.....	6,687,500

Refiner's profit.....	\$1,500,000
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The refiner may take his profit anywhere and spend it, or he may reinvest it in the community and thus build up the State, but the immediate distribution that takes place is only the \$187,500, or the employment of about 235 men.

The engineer buys raw material to the extent of....	\$5,000,000
Expends in converting raw material into machinery.	7,500,000

Total cost of product ready for the market.....	\$12,500,000
The engineer sells this product at.....	13,500,000

Engineer's profit.....	\$1,000,000
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The engineer may, like the refiner, take his profit anywhere and spend it, or he may invest it in the community and thus help to build up the State, but the immediate distribution that takes place is \$7,500,000, or the employment of 9375 men. This illustrates the difference between one kind of business and another as to their effect in building up a State. The unfortunate thing is that the business that produces the greatest difference in cost between the raw material and the finished product should be the most difficult to establish as a permanent enterprise on the Pacific Coast. If our labor costs could by any such plan as I have outlined be made to approximate what they are on the Atlantic Coast, I believe that we could build here all the machinery, ships and other engineering products that the development of the Pacific Coast requires. We should thus soon acquire a population that would give impetus to every enterprise and start this whole great territory on the high road to such a development as is not now dreamed of by the most advanced optimist among us.

The Demand for High Grade Brass Castings.

Referring to the fact that the majority of jobbing brass foundries cater to the heavy work trade, the castings for which may be made with a considerable percentage of scrap, the *Brass World* believes that a reaction will come from the sharp competition thus created and that a better grade of castings will at length be required. Price has had so much to do with the awarding of contracts that quality has depreciated. The article further says:

"Many castings have no requirements except that they shall be brass. Others require ease in machining. Pin holes, dross or other imperfections do not injure them. Other castings are required to respond to a little more rigid requirements. On the other hand, there is a demand for castings which shall be right in color, in machining and in solidity. We do not refer to statutory work or similar lines of art castings which are in a class by themselves and without the province of the jobbing foundry, but to castings which can be made with the ordinary brass founders' equipment. We feel sure that a brass foundry which advertises a fine grade of brass castings as one of its products and is prepared to turn them out regularly will find an increasing demand for its wares. The price, which must, of course, be high, will gladly be paid provided the quality of the castings is such as to warrant it. Such castings are not always small nor difficult to mold. The grade of castings turned out by the manufacturers of high grade builders' hardware will suffice to indicate what is necessary. It will take a jobbing foundry quite a time to build up a trade of this character. New metals will have to be used and good molding, but when a reputation is established the business will be profitable, for good prices can be obtained."

Valuable data have been obtained from traction experiments conducted with ordinary farm wagons by the Civil Engineering Department of the Iowa State College. In the worst spring condition of the roads the average pull in pounds per ton on the level on an old and very dirty gravel road is about 190 or 200 pounds; on a better gravel road about 135 to 150 pounds. In the ordinary dry condition the tractive pull required on these roads is only from one-third to one-half of these amounts. Earth roads are of course much worse. In the worst spring condition tests showed pulls from 234 to 531 pounds per ton, with an average of about 330; in dry weather these figures become 83 to 215 pounds, averaging about 125. All of these tests were made with farm wagons having front and rear wheels 42 and 52 inches in diameter, respectively, and with tires $1\frac{1}{4}$ inches wide on all wheels.

The Cincinnati Plate Bending Rolls.

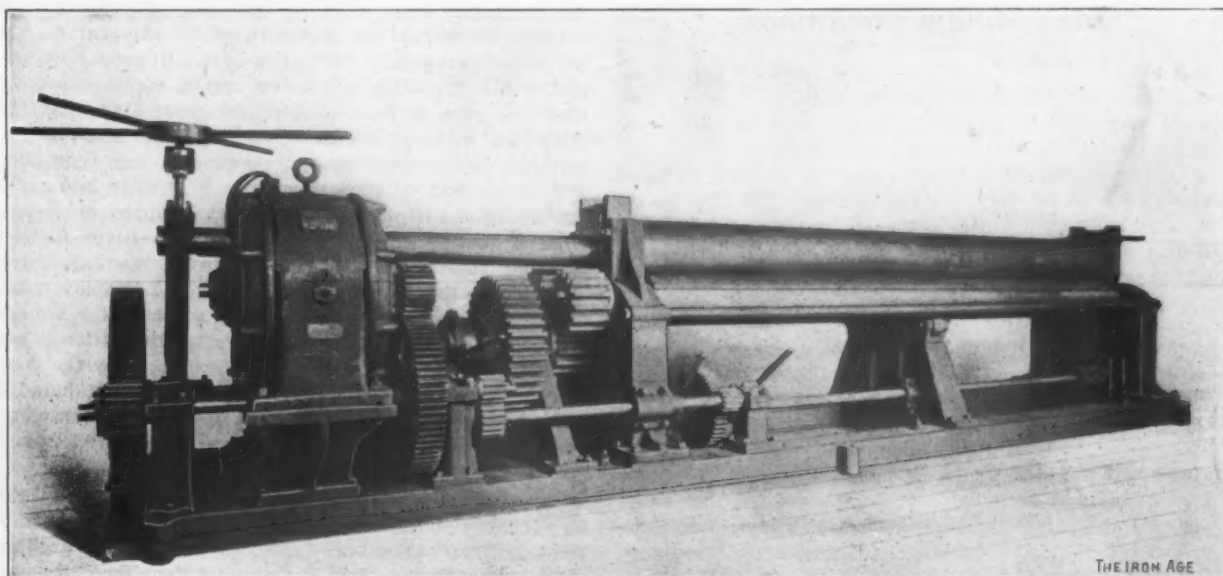
A single motor provides the drive for all the movements of the plate bender shown in the accompanying illustration, which is made by the Cincinnati Punch & Shear Company, Cincinnati, Ohio. The machine is triple geared and the three rolls are arranged in pyramidal position. The smaller gears are of steel and the larger ones are of hydraulic iron, machine molded. Steel bars support the bearings of the upper roll and the ones at the outer end swing outward to allow the taking off of cylindrical work when finished. The two lower rolls are driven by steel gears meshing with a driving pinion connected through a clutch with the motor. The upper roll is extended to receive the pressure of a screw bearing to support it when the outer bearing is swung down to allow the removing of a ring or flue. The lower rolls have an intermediate support.

Three clutch levers control the movements. The one nearest the motor starts and stops the roll, and the two at the front near the center control the raising and lowering of the ends of the upper roll independently; that is, the adjustable bearings of the upper roll may be raised

Model Mining Towns.

Two of the most interesting sociological experiments on trial in the United States are in mining regions of the West, far removed from each other, but both along the same lines and both for the purpose of providing comfortable and secure homes for miners and others interested in the operation of mines. Both are based on the conviction that if the men about mines are well provided with creature comforts of the higher order they will be less liable to discontent and that better labor can be secured than if these comforts were not looked after.

One of these is the new town of Warren, in southern Arizona, which is to be built on a most elaborate scale and after most searching investigation. It is worth a story by itself. The other is the new village of Coleraine, now under construction on the western end of the Mesaba range, in Minnesota, and designed by the Oliver Iron Mining Company to aid in solving the problem of labor for its mines there and to provide a comfortable headquarters for the thousands of men it ultimately expects to maintain thereabouts. The large iron mining companies have had very little opportunity to go forward in



Motor Driven Plate Bending Rolls, Built by the Cincinnati Punch & Shear Company, Cincinnati, Ohio.

uniformly, or one may be raised more than the other, to set the rolls for rolling conical forms.

The large motor is useful in operating the upper roll when short bends are being made without the lower rolls rotating. Besides the general compact arrangement of the drive, all the four movements of the machine are obtained from the one motor, or in case of belt drive from one pair of pulleys; hence the cost of installation and maintenance is much less than obtained by any other method. The motor is of the variable speed type, is reversible, has a capacity of 20 horse-power and operates on 220-volt direct current. The reduction of speed through the gearing is from 650 revolutions per minute of the motor to five revolutions of the roll.

The rolls measure 12 feet 4 inches between the housings. The top roll, which is the idler, weighs 3 tons and is 13 inches in diameter, while the two lower rolls are each 10 inches in diameter. The machine has a capacity for bending sheets 12 feet wide and $\frac{5}{8}$ inch thick. It occupies a floor space of about 4 x 22 feet and weighs approximately 30,000 pounds.

Among the very highest records in pumping engine performances was that recently attained at the Bissell's Point pumping station of the St. Louis Water Works. A duty of 181,068,605 foot-pounds per 1000 pounds of steam, or 158,851,000 foot-pounds per 1,000,000 heat units, was shown at the acceptance tests of the pumping engine. This record is said to have been exceeded in only one instance.

such a matter as this with a free hand, as all the towns of the Lake Superior district had been established by the force of circumstances long before their advent. However, the erection of an entirely new mining district on the western Mesaba by the Oliver Company has given the opportunity, which the company has not been slow to take advantage of. It is true that adjacent to its land the town of Bovey had been started before it took up the matter, but it may be questioned if that is a disadvantage, though it detracts from the value of the experiment, as a sociological question, by furnishing close by all the features which in Coleraine will be eliminated.

Coleraine will be in the center of a district that will produce from 1,500,000 to 2,500,000 tons a year, much of it from underground, much from surface mines and much of it of a character that will necessitate ore dressing, increasing the labor costs of the operation. Already hundreds of millions of tons of ore have been shown and more is being proved as fast as drills can open it, while several shafts have been put down and costly plants for pumping and hoisting erected. All winter 100 teams have been employed between Coleraine and the nearest railroad point, carrying supplies and fuel, and a long branch of the Duluth, Mesaba & Northern Railroad will be completed to the point in a month or two. It is asserted that many million yards of stripping will be taken off ore bodies there as fast as it can be removed and that this work will consume many years. This is to be done by the company itself, without the intervention of contracting firms.

The company will be most liberal in its sales of building lots and in all cases plenty of room is provided for residents, streets will be opened and modern comforts and conveniences provided on a broad scale. In the matter of saloons, which are the bane of all mining towns, there will be certain restrictions. The company has come to the conclusion that one saloon for every 250 inhabitants is ample to care for the thirsty, even though in many adjacent towns the proportion is, say, 1 to 100, or even 1 to 90. All laws as to Sunday and night closing will be enforced. Plans of buildings must be submitted to the engineering department and accepted before construction can proceed. This is not so much to govern style as to see that buildings are of a permanent character and suitable for the part of town in which they are erected. Suitable provision has been made to the end that there shall be little speculation in vacant business property. As the Oliver company secured the land upon which the town is to be built at little cost, it proposes to return to the village treasury the sums received from the sale of lots, which shall be devoted to the construction of sewers, streets, and municipal plants for water, light and of other nature.

Lake Mining Conditions.

DULUTH, MINN., April 28, 1906.—Ore, contrary to statements of Cleveland correspondents, is moving forward very rapidly, and a big April business has been done through the Sault canals, but even a short tieup by a lake strike will make many an outside furnace wonder where its stock is coming from. The Pittsburgh Steamship Company does not look for much trouble, for it has agreements with most unions and it has docks where sympathetic strikes of unloaders cannot stop work.

The Oliver Company Very Actively at Work.

An enormous amount of work is under way in the immediate vicinity of Hibbing, and the shipments from that part of the Mesaba range will considerably exceed those of 1905, which were more than 9,000,000 tons. The Oliver Iron Mining Company is very busy in the vicinity of the Hull and Rust mines, where it is doing a vast amount of stripping. It is symbolic of the enterprise of this company, and of Mesaba range conditions in general, that while this stripping was begun early in the past winter it is hoped during the present year to take out well toward 1,000,000 tons from the property; in other words, to open a mine and produce such a tonnage in less than a twelve-month. Such a thing has been done once on the Mesaba, but nowhere else in the world. The Mahoning Ore & Steel Company owns a tract of land running 2 miles east and west and 1320 feet wide, starting at the village limits of Hibbing and running west. It is about 1½ miles west of Hibbing, on this tract, where its famous open pit is located, which covers an area of about 65 acres. Immediately south of this pit the Oliver Iron Mining Company owns 200 acres in its Hull mine, is stripping it rapidly and is down almost to ore in several places. It has opened a triangular pit running from the Mahoning pit southward, and connecting on the north with the latter. At present this pit, with approaches, covers about 25 acres, but it is daily being enlarged. It is from this pit that the company hopes to take the tremendous tonnage that has been referred to above. In a few days seven steam shovels will be at work there, most of them stripping. On this tract and the adjacent 65 acres of the Mahoning there will be this season from 12 to 14 steam shovels, doubtless a greater number than have ever been employed any where on a similar area, at least in mining operations. It was for this work that the Oliver Company located a large part of the great order of shovels and locomotives that it made last fall.

At the Oliver Company's large Burt mine a couple of miles east of Hull, which last year produced 1,800,000 tons, little mining has started this year, for the new approach is not yet completed, and until it is there can be but little tonnage, comparatively speaking. The approach used last year was on a level too high for further operations, so great was the tonnage taken out from

the levels at and above the former approach. This matter of approaches in open pits of the Mesaba range, where the tonnage mined is large, is very important, constituting an item whose annual cost is large. If the approach can be in ore, as in the new work at the Mahoning, it makes little difference, but when the approach must be for a long distance in surface, its cost is no small item against the ore mined. At the Mahoning two shovels are now employed mining ore in the approach, and to one unacquainted with the Mesaba this approach alone looks very much like a big mine.

There is much activity in small mines of the various ranges, and a number of properties are being opened that contain considerably less than 1,000,000 tons each, but from which a good output of excellent ore will be mined this year. Some of these are easily opened and will make a cheap product. Taken together they will have an important effect on the year's output.

On the Menominee Range.

At the Baker property at Iron River, Menominee range, the shaft is now in ore and is making good progress. An overburden of sand ran to nearly 90 feet, and the sinking was difficult and slow. The shaft is now 110 feet deep. At the various explorations of the Buffalo & Susquehanna Company in the Iron River district there is little in the way of ore to report, as the explorations are not as yet successful. Indications are still good, however, and while the drills are being moved about somewhat they are sure to be continued for some time. At the Hiawatha mine of the same company the shaft is unwatered and underground developments are beginning. The Winnifred Mining Company, in which late chief officials of the Republic Iron & Steel Company are heavy holders, is interesting itself in the Iron River district and has taken one and perhaps two properties there. The first is the Morgan land, joining the Caspian mine, and it is to be explored at once. The second is the Youngs mine, near Spring Valley, whose precise disposition is not yet known, but which is supposed to be taken by the Winnifred. This company has now plenty of capital and a good deal of experience in deals of various characters, and should be able to get together a considerable tonnage.

Michigan Copper Operations.

The early spring has started construction work on the Keweenaw Copper Company's railroad project, and in a few days a large number of men will be employed grading the new line between Lac la Belle and the village of Calumet, a distance of 32 miles. The construction of this road will be of the utmost benefit to the Keweenaw Company and the Calumet & Hecla, which latter is developing a number of old properties in the vicinity with marked success, if current reports are correct. There has never been anything like adequate transportation facilities for this district.

The underground development of the Keweenaw Company will not proceed as fast as many have supposed. Several diamond drills are now working on the property, so that a full geological knowledge may be had, and it may be stated that no shafts will be driven till this knowledge is very full and definite. The Calumet & Hecla is drilling and is sinking a shaft on the old Delaware, but until this shaft is well down there is no probability that any further extensive work will be undertaken. The developments that have been made in drills and by shaft up to date have been very encouraging, and it looks as though the companies operating there would reap a rich reward in due time.

D. E. W.

According to the *Japan Weekly Mail*, the steam tonnage under the Japanese flag increased from 197 vessels, amounting to 511,661 tons, in December, 1903, to 283 vessels, of 726,310 tons, in July, 1905, the net increase being 86 vessels, of 214,649 tons. In addition to this, there were under construction for Japanese owners on the latter date some 45,000 tons of new ships, while the prizes from the war with Russia have added 88,000 tons more. This makes the total Japanese register of steamers alone aggregate 860,000 tons. This is only 83,750 tons under the amount which the United States has (sail and steam) registered for foreign trade, the figures reported for the last fiscal year being 943,570 tons.

The Electro-Thermic Production of Steel.

Electric smelting was discussed at length at a meeting of the Faraday Society in London, England, on April 10. In a paper contributed by Charles A. Keller on the "Electro-Thermics of Iron and Steel" the author described what has been done at the Livet works of the Keller-Leleux Company in the production of iron and steel in the electric furnace. The success of this undertaking has led J. Holtzer & Co. to put in an electric steel plant at their Unieux works to manufacture steel for cannon and projectiles. Here it is proposed to run the steel obtained in a Siemens-Martins furnace into the electric furnace immediately after the oxidizing melt, completing the remaining operations by the use of the electric current. About 8000 kilos of metal can be dealt with at a time and the operation is repeated three or four times in 24 hours. The author believes that the performance of this electric steel plant at Unieux will decide the industrial position of the electric furnace. Results were also given of experiments on various ores, with a view to comparing the metal obtained by the electric furnace with that coming from the blast furnace using the same ore. The Keller electric furnace absorbed 1000 horse-power. In addition to the elimination of sulphur it is claimed that the Keller furnace showed an advantage over the blast furnace in the ability to vary more readily the percentage of silicon and carbon. Castings in which the silicon ranged from 0.90 to 8 per cent. were obtained at will. An excellent gray iron casting is said to be produced from the ore. There has now been set up at Livet an electric furnace of 2000 horse-power, which is capable of producing about 20 tons of castings in 24 hours.

Commenting on the paper, F. W. Harbord said that in his opinion there is no field for an electric furnace in a country where the blast furnace works economically. Referring to the wide variation in silicon, which it was claimed is an advantage, he said that in practice castings would not be made direct from the blast furnace, foundrymen readily varying the silicon content by mixing in the cupola pig irons containing different percentages of silicon.

A paper by E. Stassano described the rotating electric steel furnace planned for the Artillery Construction Works at Turin. Three furnaces are to be installed, which will be used mostly for refining pig iron and melting scrap, but it is expected to demonstrate the commercial possibility of making iron and steel in one operation direct from the ore. The furnace is slightly inclined to the vertical. Mr. Harbord pointed out that there was not much advantage in the rotation, which was performed once or twice in a minute. Mr. Stassano, he said, is using ordinary steel scrap. The claim was made that steel could be made direct from the ore, of any required carbon, but it is yet to be seen whether this can be done on a commercial scale. Mr. Harbord added that the efficiency of the furnace was not quite up to that of the Héroult and Keller furnaces, and he did not believe it possible in the Stassano furnace to get the slag off to the same extent as is done with the Keller furnace.

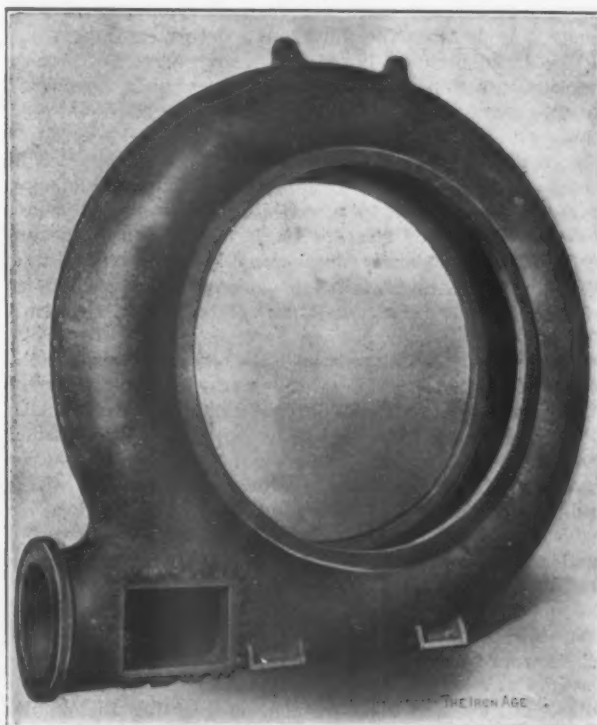
At the same meeting a paper was read, contributed by Gustav Gin, on recent developments in the electric furnace bearing his name. The particular feature of this furnace is the canal, but the opinion was expressed by some of those present that it would not work in practice. The paper referred to a furnace designed to yield more than 350 tons of metal in 24 hours, but the claim of such an output was considered quite premature.

Steel Corporation Traffic Men Meet.—Traffic managers of various companies of the United States Steel Corporation met in Pittsburgh recently to consider subjects of import in their department. J. S. Keefe, vice-president of the American Steel & Wire Company, who is chairman of this traffic committee, presided. Among those present were: A. S. Mack, freight agent of the United States Steel Products Export Company of New York; Daniel Bates, division freight agent of the American Steel & Wire Company, Worcester, Mass.; F. T. Bently, traffic manager of the Illinois Steel Company,

Chicago; J. A. Coakley, division freight agent of the American Steel & Wire Company, Cleveland, and the following Pittsburgh men: Traffic Manager Bihler of the Carnegie Steel Company, Traffic Manager Belsterling of the American Bridge Company, Traffic Manager Townsend of the National Tube Company, Traffic Manager Young of the American Sheet & Tin Plate Company, and Division Freight Agent Davis of the American Steel & Wire Company.

A Remarkable Steel Casting.

The accompanying illustration shows a somewhat remarkable steel casting that was recently made at the plant of the Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa. It is a centrifugal pump barrel casting, the outside diameter of which is approximately 12 feet, the inner diameter 7 feet, and the depth through,



A Large Centrifugal Pump Barrel Cast in Steel by the Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa.

approximately, 30 inches. The average thickness of the metal is $2\frac{1}{2}$ inches.

A steel casting shrinks in cooling about twice as much as cast iron, and the shape of this casting was such that particular provisions were necessary to allow for the shrinkage without impairing the strength of the casting. This shrinkage takes place uniformly toward the center, and a special rigging was placed over the flask bars supporting the core of the mold, consisting of a flat disk plate in the center, having radial slots about its outer edge. Into these slots were fitted shanks attached to the inner ends of the flask bars, which were semicircular in shape and occupied one-half the core. These shanks were shorter than the slots and the difference was taken up by keys, which were withdrawn from each groove immediately after the casting was poured to allow the bar to move toward the center.

Particular care was also necessary in the pouring of the casting, as the high pressure under which the pump is operated when in service increases the necessity of the casting being absolutely free from blow holes or shrink cracks. The size of the flask necessary to make this mold was 12 x 16 feet and 4 feet deep.

By a vote of 7 to 5 the House Committee on Coinage, Weights and Measures April 27 took adverse action on the bill to establish the metric system as the standard of weights and measures in transactions with the Government.

Collapsing Pressures of Bessemer Steel Lap Welded Tubes.*

BY PROF. REID T. STEWART.

This research was undertaken to supply reliable information on the behavior of modern wrought tubes when subjected to fluid collapsing pressure. It covers two series of tests, one on tubes that were 8½ inches outside diameter, for all the different commercial thicknesses of wall, and in lengths of 2½, 5, 10, 15 and 20 feet, and the other on single lengths of 20 feet.

The planning and execution of this research were especially difficult because of the lack of reliable data on the behavior of modern wrought tubes when subjected to a fluid collapsing pressure. Fairbairn's classical experiments, made about a half century ago, were naturally not of a character to furnish suitable data for planning a similar but much more elaborate research on modern tubes. Aside from the numerous existing formulæ, some 10 or 12 in number, based practically upon Fairbairn's experiments, and therefore not to be seriously considered in this connection, the only available data consisted of a few isolated experiments on flues and several records of the condition under which tubes and flues have failed in service, together with a table of computed collapsing pressures published in a well-known handbook, whose origin could not be traced. As an illustration of the unreliability of existing data on this subject, the first wrought tube tested failed at a pressure exceeding by about 300 per cent. that calculated by Fairbairn's formulæ.

The experimental part of this research was carried out under the direction of the author at the National Department of the National Tube Company, McKeesport, Pa. He is greatly indebted to the officials of the National Department for the courtesy shown him, especially to the manager, G. G. Crawford, to the superintendent of the tube mills, A. M. Saunders, and to J. A. McCulloch, in whose department the special apparatus was constructed and the experiments conducted. The exceptional consistency of the results obtained is due in a large measure to the care with which the author's assistants, H. G. Wardale, H. E. Williams and J. N. Kinney, have done their work; and the value of the final conclusions is due largely to E. E. Shanor and F. P. Kramer, who, under his direction, deduced the formulæ representing the results of the experiments and prepared the tables, charts and drawings contained in the body of this paper.

The original Log of Tests comprises, in addition to what has been abstracted for this paper, a complete file of autographic calipering diagrams, photographs showing two views of each tube after being collapsed, impressions from the collapsed sections, and remarks on each individual test. The complete record fills two quarto volumes, each about 5 inches thick, and the matter resulting from working up this data to get the final results is sufficient to fill a third volume.

Preliminary Considerations.

While planning this research it was assumed that the resistance offered by a tube to an external fluid pressure would depend upon the following: The diameter of the tube; the length of tube between transverse joints or end connections tending to hold it to a circular form; the thickness of the wall; the deviation of the tube from perfect roundness, and the physical properties of the material of which the tube is made.

Of these five things that may vary it was thought that, for the preliminary experiments, at least, the last two would be practically constant; because the tubes, being all made by the same process, would probably run fairly uniform as to deviation from roundness, and because the material, Bessemer tube steel, is known to run fairly uniform in its physical properties. The only variation, then, to be expected would be that due to the inability of the manufacturer to turn out a uniform product. It is recognized here that the physical properties of rolled steel depend in some measure upon the thickness

of the plate, or the wall of the tube. It is clear that any variation would be a function of the thickness, and would consequently be taken care of in an empirical formula by the quantity representing the thickness.

All the published formulæ on the subject indicated that the diameter and thickness of wall have each an influence on the collapsing pressure of a tube, and since there were the best theoretical reasons for believing this to be the case it was decided to plan the research to discover the nature of this influence over a wide commercial range.

The influence of length of tube, between transverse joints, or end connections tending to hold it to a circular form, upon the collapsing pressure, appeared to be the most uncertain of all the variables entering the problem. It was therefore decided, first of all, to determine the precise nature of this influence.

To do this the

Hydraulic Test Apparatus

illustrated in Fig. 1 was adopted, consisting of a test cylinder with one head removable for receiving the tube to be tested; a low pressure water supply to fill the test cylinder; a variable high pressure water supply furnished by a hydraulic pressure pump; a set of pressure gauges, having a large range in capacity, connected so that they could be used either singly for indicating the fluid pressure within the test cylinder or in combination for comparison; a vent pipe leading from the interior of the tube under test through the head of the test cylinder to the atmosphere, and an air vent connecting with the highest point of the interior of the test cylinder.

In addition devices were used for manipulating the removable head and for handling the tubes while being entered and withdrawn.

Sixteen-Inch Test Cylinder.—This cylinder was made up of two sections, whose combined length was 30 feet, to accommodate a 20-foot length of well casing. The sections of this cylinder were Bessemer steel lap welded tubes, 16 inches outside diameter and ¾ inch thick, to which steel flanges were welded for the intermediate joint. Thickening rings were welded to the ends intended to be threaded for the attaching of the heads. The highest fluid pressure reached in this test cylinder was 2890 pounds per square inch. This corresponds to a stress of 28,000 pounds per square inch in the wall of the cylinder. All tests at higher fluid pressure were made in an 8-inch test cylinder, which was relatively about twice as strong.

The heads for the 16-inch test cylinder were made from circular steel blanks 2½ inches thick, pressed into shape, while hot, by a hydraulic press. They were fitted to the test cylinder by trapezoidal threads to best resist stress in one direction. In one test these threads were subjected to a shearing stress of 666,000 pounds. The flange joints connecting the different sections of the test cylinder were tongued and grooved, and were made up with leather packing in the bottom of the grooves. These joints each contained 18 1¼-inch steel bolts, and were fully as strong against internal fluid pressure as the wall of the cylinder.

Means of Filling Test Cylinders.—The rear end of the test cylinder was connected, as shown in Fig. 1, to the low pressure water supply for rapidly filling the space within the cylinder, surrounding the tube under test, the pressure within being maintained constantly atmospheric by the air vent at the top of the left hand head. This vent also served to entirely free the cylinder from imprisoned air, thus reducing the distortion of the tube when failure occurred, and also rendering a serious accident impossible in case rupture of the cylinder wall should occur while making a test.

Hydraulic Pressure Pump.—The pressure within the test cylinder was created by a hydraulic pressure pump capable of working against a fluid pressure up to 3000 pounds per square inch. Ordinarily this pump was operated at the time of expected collapse, so as to increase the fluid pressure at a rate of from 2 to 10 pounds per second, depending upon the gauge used. At these rates of increase of pressure the conditions were favorable for the making of an exact determination of the fluid pressure under which the tube failed.

* Abstract of a paper presented before the American Society of Mechanical Engineers, at Chattanooga, Tenn., May 2, 1906.

Pressure Gauges.—The gauges used for indicating the pressure were three Shaw differential piston mercury gauges, having capacities of 1000, 3000 and 8500 pounds per square inch. They were connected as shown in Fig. 1, so that any one or more could be connected to the test cylinder to indicate the pressure. They could also be interconnected to compare their scale readings at different pressures.

at or near one end than near the middle this made it possible to avoid frequent delays. This smaller test cylinder was supported upon the larger one and was connected to the same set of pressure gauges and operated precisely as was the larger apparatus.

To get a fluid pressure equal to the greatest working capacity of this cylinder two hydraulic pressure pumps, each of 3000 pounds capacity, were coupled in series.

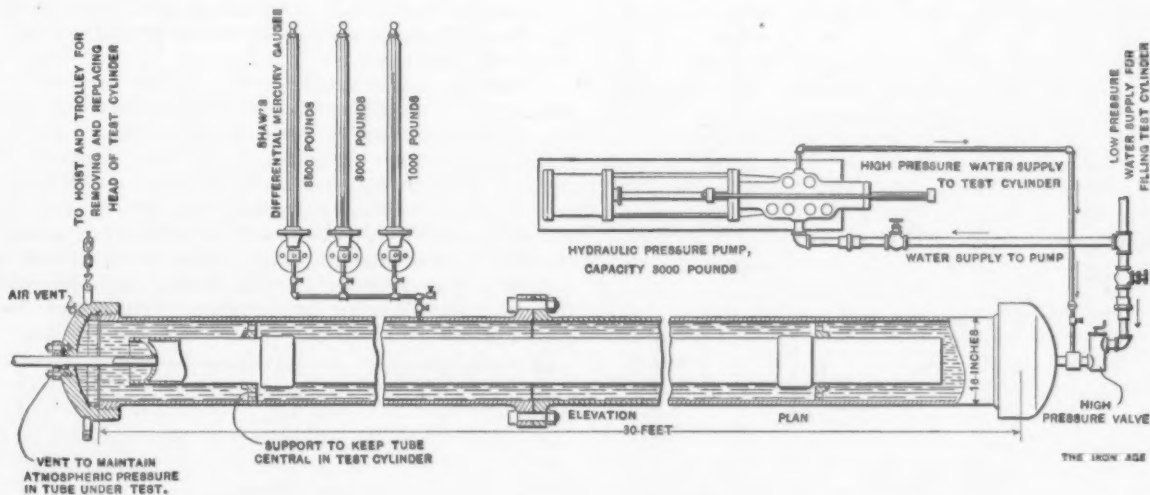


Fig. 1.—16-Inch Hydraulic Test Apparatus for Collapsing Tests on Tubes.

Eight-Inch Test Cylinder.—This smaller cylinder was constructed for testing the 3 and 4 inch tubes. It was made from a single 20-foot length of 8-inch double extra strong pipe, 8 $\frac{1}{2}$ inches outside diameter and $\frac{3}{8}$ -inch wall.

The details of one end of this cylinder, with tube under test in place, are shown in Fig. 2, the other end being an exact duplicate. This apparatus is arranged to permit testing a plain end tube, with the ends open to the atmosphere and the interior of the tube exposed to view while under test. In this way the tube is entirely relieved of longitudinal stress due to the fluid pressure surrounding it. The sectional view shows clearly the construction of the cylinder. The tube is held in place within the test cylinder by steel centering rings, one at each end, while the cup leather packing rings are being

The highest pressure attained was 5625 pounds per square inch.

Test Heads, Supports and Vents.—The different styles of test heads used, the manner of supporting the tube in the test cylinder, and the vent pipes connecting the interior of the tube under test with the atmosphere are clearly shown in Fig. 2. The coupled test heads were made up from short lengths of tubing of the same diameter and thickness of wall as that of the tube under test. One end of this test head was threaded like the tube, the two being connected by a standard sleeve coupling, as two sections of the same tubing would be connected in practice. The other end of each test head was closed by a steel disk inserted into its end and welded, the closed end of the left hand test head being drilled and tapped

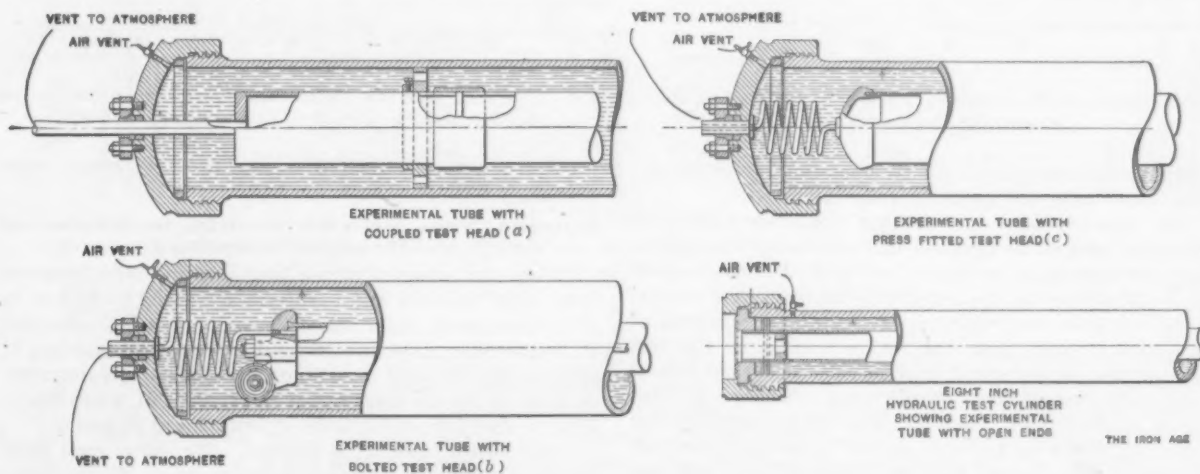


Fig. 2.—Hydraulic Test Cylinders Showing Experimental Tubes in Position.

slipped in place over the ends of the tube to be tested. This leather packing ring, at each end of the test cylinder, is backed by a cast iron ring that fills the space between the inner surface of the end of the test cylinder and the outer surface of the end of the tube. This latter ring is held by a steel sleeve engaging its outer surface by an internal flange, and which is attached to the end of the test cylinder by trapezoidal threads.

A plug was inserted near each end of the experimental tubes to prevent the centering ring and packing from being damaged and the difficulty of removing a tube that might result from the tube collapsing in the end connections. Since a commercial tube is more apt to collapse

for the end of the vent pipe. This style of test head was used for all the tests of series I and for portions of series II. This method of closing the ends of the experimental tubes proved to be both slow and expensive, and when it was discovered that the influence upon the collapsing pressure due to the tendency of the end connections of a tube to hold it to a circular form ceased to be measurable for a commercial tube at a distance along its length from either end of from three to four diameters, the less expensive and otherwise more satisfactory methods below described were used.

The bolted test head, Fig. 2, was suggested by the appliance commonly used to subject a tube to an internal

or bursting pressure. It consisted of a casing with a circular groove cut in its face to receive the plain end of the experimental tube. At the bottom of this groove was inserted packing to produce a water tight joint when the head is firmly pressed against the end of the tube. The two through bolts shown were merely to hold the two heads in place and prevent leakage at the start of the test, the external fluid pressure during the continuance of the test maintaining a tight joint between the test head and the end of the tube. These test heads were each provided with two small rollers to facilitate handling the experimental tubes while being inserted and withdrawn from the test cylinder. The left hand head was drilled and tapped to receive the vent tube, which was coiled in a spiral to give it greater flexibility.

The press fitted test head, shown in Fig. 2, was the simplest of all the devices tried. These heads consisted of iron castings, grooved, as shown, to receive the ends of the experimental tubes. These grooves were close fitting on the sides and contained packing at the bottom, forming

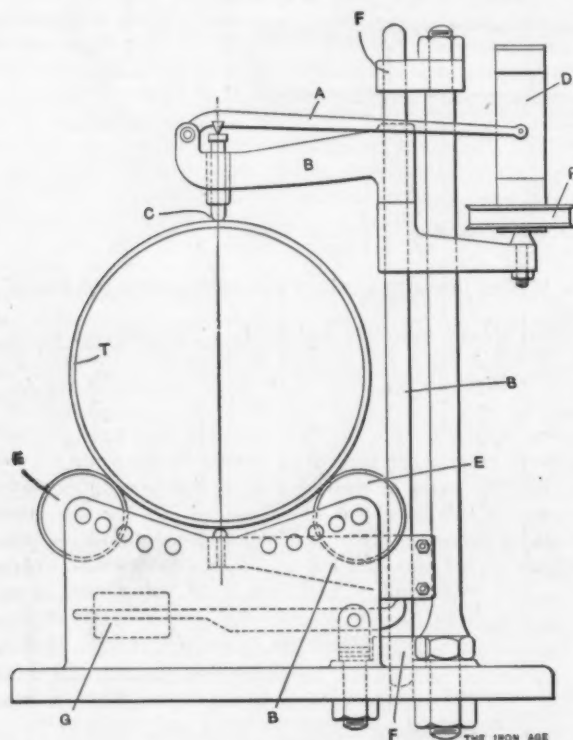


Fig. 3.—Autographic Calipering Apparatus for Measuring the Out-of-Roundness of Tubes.

a very satisfactory joint that became stancher as the external fluid pressure upon the tube increased.

The vent pipes for maintaining atmospheric pressure within the tube, while the external fluid pressure was being gradually increased, are shown in Fig. 2. For the coupled test head, where the experimental tube was held central in the hydraulic test cylinder, the vent pipe consisted of a 1½-inch straight pipe, one end screwed into the test head of the experimental tube, while the other passed through the end of the hydraulic test cylinder. A joint stanch against fluid pressure was maintained by the cupped leather ring packing shown. For the other two styles of heads, where the experimental tube was not necessarily kept central in the hydraulic test cylinder, the flexible vent pipe, made by coiling a sufficient length of ½-inch gas pipe into a helical form, was used.

Autographic Calipering Apparatus.

Since it was anticipated that the out of roundness of a tube would influence its behavior, a piece of apparatus was devised to indicate this deviation from perfect roundness accurately.

Calipering Apparatus.—The construction and operation of the autographic apparatus are shown in Fig. 3. The tube being calipered is made to rotate on supporting guide wheels, one pair of which are shown at E E. The frame B B B, by means of the guides F F and the counterbalancing lever and weight G, keeps the lower calipering

point constantly in contact with the under surface of the tube. Any variation in the length of the vertical diameter of the tube while rotating will cause a motion of the upper calipering point C with respect to the frame B B B, which is magnified tenfold by the lever A and then recorded on a sheet of paper wrapped about the record drum D. Motion is communicated from the tube T to the record drum D by a cord weighted at both ends to prevent slipping, the cord being made to pass once around both the tube and the pulley P attached to the record drum D. In this way the tube being calipered and the record drum are made to rotate synchronously.

On these cards a reference line, similar to the atmospheric line on an engine indicator card, is drawn by rotating the record drum by hand while a distance piece is placed between the calipering points, the length of this distance piece being equal to the nominal outside diameter of the tube being calipered. The result is a horizontal straight line. The record is produced by rotating the tube between the calipering points in the manner described. The distances between these two lines show, then, to a tenfold scale, the variation of the actual diam-

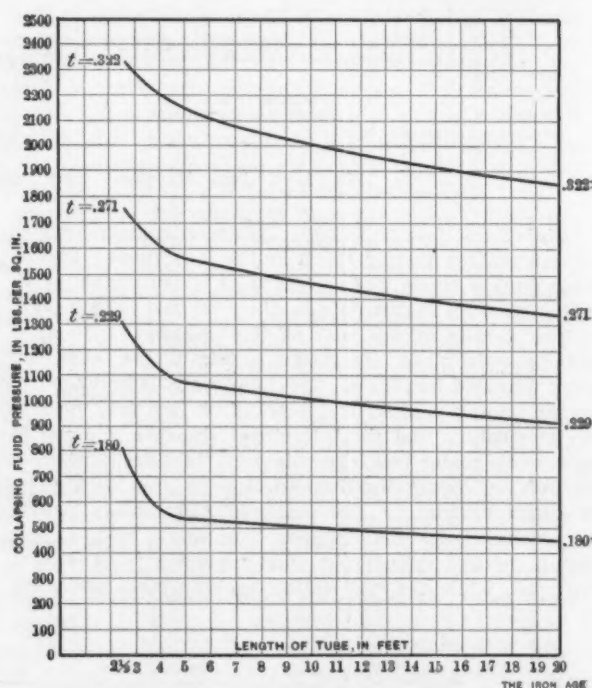


Fig. 4.—Chart Showing Values for Collapsing Pressures of 8½-Inch Outside Diameter Tubes, Based on Tests.

eters from the nominal diameter for any given cross section.

Collapsing Tests, Series One, Showing the Influence of Length of Tube on the Collapsing Pressure.*

Since the influence of the length of the tube, between transverse joints or end connections tending to hold it to a circular form, upon the collapsing pressure, appeared to be the most uncertain element entering the problem, it was decided to make a series of tests on a single diameter of tube for all the commercial thicknesses of wall obtainable, in five different lengths of from 2½ to 20 feet.

Selection of Tubes for Testing.—The tubes used were obtained from the national department of the National Tube Company, McKeesport, Pa., and were fair samples of the regular commercial product of the mills.

Diameter of Tube Tested.—For series 1 it was decided to use 8½-inch well casing, which has a nominal outside diameter of 8½ inches, because it seemed to afford the greatest opportunities for getting at the results desired. The average outside diameter was made up from measurements on each individual tube at intervals of 1 foot along its length, these measurements being taken with a special steel tape. Each inch division was actually

* Under this heading it is only attempted to explain how the data were taken. Complete records of the actual data were given in the paper, but it was thought allowable to omit them here, as they have only a passing interest, being the means to the end of obtaining the probable collapsing pressures given in a later table herewith.

3.1416 inches long, so that diameters could be read directly from circumferential measurements.

Thickness of Wall.—There were five nominal thicknesses of wall tested in series 1: 0.180, 0.229, 0.271 and 0.322 inch, having nominal weights of respectively 16.07, 20.10, 24.38, 25.00 and 28.18 pounds per foot length for the outside diameter of 8½ inches. The average thickness of wall of the tubes was calculated from the plain end weight, length and average outside diameter. The greatest and least thickness of wall at the place of collapse were obtained from the tube after collapse by cutting it across at the point of its length where the distortion appeared to be greatest, after which the greatest and least thicknesses were measured by a micrometer caliper.

The actual plain end weights per foot length of the individual tubes tested were made up by dividing the weight in pounds of each tube by its length in feet.

Lengths of Tubes.—The tubes for series 1 were ordered in five lengths for each of the five thicknesses test-

readings of the pressure upon the tube, and also allow for free elastic deformation of the walls of the tubes. In no case was the elastic limit of the material exceeded until after failure had actually occurred, since the apparent stress on the wall of the tube at instant of failure ranged from about 7000 to 34,000 pounds per square inch, respectively, for the relatively thinnest and thickest walls in series 2. The fluid collapsing pressure in pounds per square inch was read on the 1000, 3000 and 8500 pound Shaw differential piston mercury gauges. These gauges were frequently compared, and the slight differences were adjusted so as to make the readings conform, the intention being to calibrate one after completing the tests.

Collapsed Portion.—The tubes were all calipered for out of roundness at distances 1 foot apart along their lengths before being placed in the test apparatus, and the ends of the greatest and least diameters at each of these sections were marked on the tube by plus (+) and

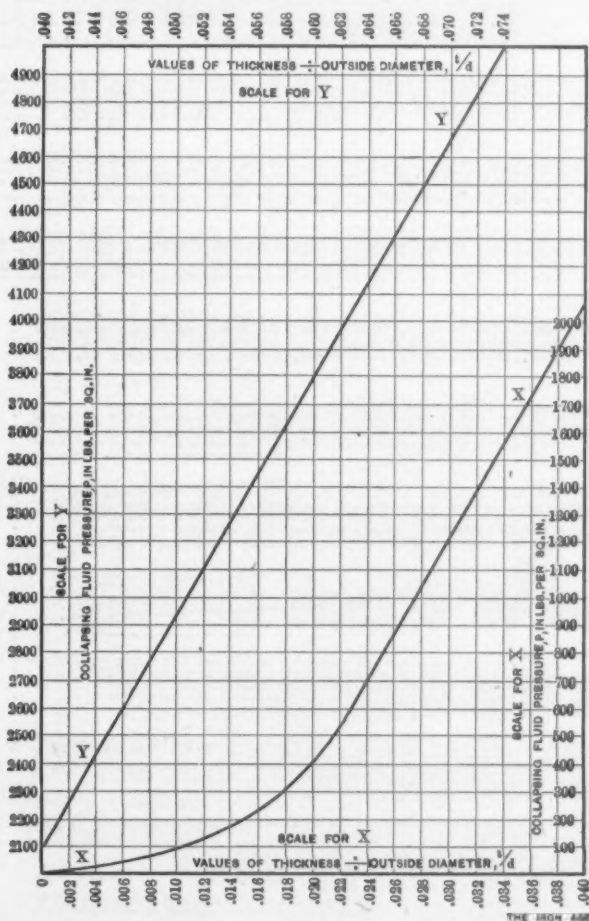


Fig. 5.—Chart Showing Probable Collapsing Pressures for Lengths Greater Than Six Diameters of Bessemer Steel Lap Welded Casings, to Be Used Where the Thickness of Wall Is Given or Required.

ed. These lengths were 20, 15, 10, 5 and 2½ feet, including the threaded ends, for this series. For the tubes of all the other series the length in each case was 20 feet, for both plain and threaded ends. The actual lengths of the tubes to the nearest thousandth of a foot were measured with a steel tape. These measurements include both threaded ends, but not the coupling. The unsupported lengths of the tubes were arrived at by subtracting the lengths of the portions of the threaded ends that lay inside the couplings from the corresponding actual lengths. These represent the actual lengths exposed to collapsing pressure, and which received no direct supporting action from any outside source tending to hold it to a circular form. These were the lengths used in deducing the general conclusions from the individual experiments.

Collapsing Pressure.—In and near the region of expected collapse the hydraulic pressure within the test cylinder and surrounding the tube under test was increased at a rate low enough to permit making accurate

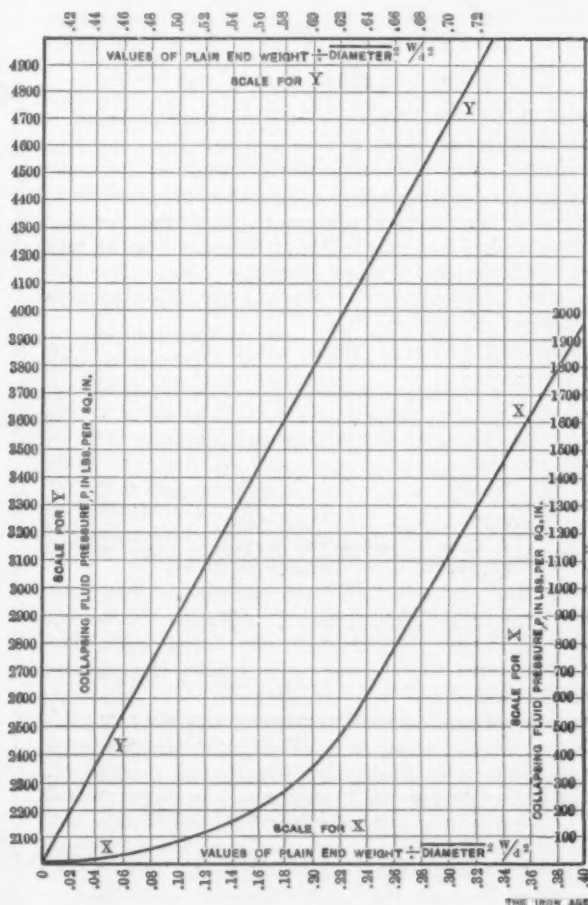


Fig. 6.—Chart Showing Probable Collapsing Pressures for Lengths Greater Than Six Diameters of Bessemer Steel Lap Welded Tubes, to Be Used Where the Plain End Weight Is Given or Required.

minus (—) signs, or naughts (0), where the tube was so nearly round as to make it difficult to distinguish a greatest and least diameter at that section. The length of collapsed portion of tube in feet was determined, after collapse, by measuring the length of the portion of the tube which showed a permanent distortion. The lengths of the collapsed portions expressed in diameters of the tubes were obtained by dividing the length of collapsed portion of each tube by its outside diameter. The distance of collapsed portion from the end of the tube was obtained by measuring the distance from the point of greatest distortion to the numbered end of tube. The angular distance from weld was obtained by measuring the angular distance from the axis of collapse to the weld. Assuming that the observer is stationed at the numbered end of the tube and looking in the direction of its length, angles measured in the direction in which the hands of a clock rotate are marked plus (+), while those measured in the opposite direction are marked minus (—). These angular distances were measured

Table I.—(Continued.)

Thickness of wall, Inches.	5 1/2 inches O. D.	6 inches O. D.	6 1/2 inches O. D.	7 inches O. D.	7 1/2 inches O. D.	8 inches O. D.	8 1/2 inches O. D.	9 inches O. D.	10 inches O. D.	11 inches O. D.	C. P.
0.10	6.04	6.33	6.40	6.54	6.69	6.84	6.99	7.14	7.29	7.44	...
0.11	6.07	6.36	6.43	6.57	6.72	6.87	7.02	7.17	7.32	7.47	...
0.12	6.10	6.39	6.46	6.60	6.75	6.90	7.05	7.20	7.35	7.50	...
0.13	6.13	6.42	6.49	6.63	6.78	6.93	7.08	7.23	7.38	7.53	...
0.14	6.16	6.45	6.52	6.66	6.81	6.96	7.11	7.26	7.41	7.56	...
0.15	6.19	6.48	6.55	6.69	6.84	6.99	7.14	7.29	7.44	7.59	...
0.16	6.22	6.51	6.58	6.72	6.87	7.02	7.17	7.32	7.47	7.62	...
0.17	6.25	6.54	6.61	6.75	6.90	7.05	7.20	7.35	7.50	7.65	...
0.18	6.28	6.57	6.64	6.78	6.93	7.08	7.23	7.38	7.53	7.68	...
0.19	6.31	6.60	6.67	6.81	6.96	7.11	7.26	7.41	7.56	7.71	...
0.20	6.34	6.63	6.70	6.84	6.99	7.14	7.29	7.44	7.59	7.74	...
0.21	6.37	6.66	6.73	6.87	7.02	7.17	7.32	7.47	7.62	7.77	...
0.22	6.40	6.69	6.76	6.90	7.05	7.20	7.35	7.50	7.65	7.80	...
0.23	6.43	6.72	6.79	6.93	7.08	7.23	7.38	7.53	7.68	7.83	...
0.24	6.46	6.75	6.82	6.96	7.11	7.26	7.41	7.56	7.71	7.86	...
0.25	6.49	6.78	6.85	6.99	7.14	7.29	7.44	7.59	7.74	7.89	...
0.26	6.52	6.81	6.88	7.02	7.17	7.32	7.47	7.62	7.77	7.92	...
0.27	6.55	6.84	6.91	7.05	7.20	7.35	7.50	7.65	7.80	7.95	...
0.28	6.58	6.87	6.94	7.08	7.23	7.38	7.53	7.68	7.83	7.98	...
0.29	6.61	6.90	6.97	7.11	7.26	7.41	7.56	7.71	7.86	8.01	...
0.30	6.64	6.93	7.00	7.14	7.29	7.44	7.59	7.74	7.89	8.04	...
0.31	6.67	6.96	7.03	7.17	7.32	7.47	7.62	7.77	7.92	8.07	...
0.32	6.70	6.99	7.06	7.20	7.35	7.50	7.65	7.80	7.95	8.10	...
0.33	6.73	7.02	7.09	7.23	7.38	7.53	7.68	7.83	7.98	8.13	...
0.34	6.76	7.05	7.12	7.26	7.41	7.56	7.71	7.86	8.01	8.16	...
0.35	6.79	7.08	7.15	7.29	7.44	7.59	7.74	7.89	8.04	8.19	...
0.36	6.82	7.11	7.18	7.32	7.47	7.62	7.77	7.92	8.07	8.22	...
0.37	6.85	7.14	7.21	7.35	7.50	7.65	7.80	7.95	8.10	8.25	...
0.38	6.88	7.17	7.24	7.38	7.53	7.68	7.83	7.98	8.13	8.28	...
0.39	6.91	7.20	7.27	7.41	7.56	7.71	7.86	8.01	8.16	8.31	...
0.40	6.94	7.23	7.30	7.44	7.59	7.74	7.89	8.04	8.19	8.34	...
0.41	6.97	7.26	7.33	7.47	7.62	7.77	7.92	8.07	8.22	8.37	...
0.42	7.00	7.29	7.36	7.50	7.65	7.80	7.95	8.10	8.25	8.40	...
0.43	7.03	7.32	7.39	7.53	7.68	7.83	7.98	8.13	8.28	8.43	...
0.44	7.06	7.35	7.42	7.56	7.71	7.86	8.01	8.16	8.31	8.46	...
0.45	7.09	7.38	7.45	7.59	7.74	7.89	8.04	8.19	8.34	8.49	...
0.46	7.12	7.41	7.48	7.62	7.77	7.92	8.07	8.22	8.37	8.52	...
0.47	7.15	7.44	7.51	7.65	7.80	7.95	8.10	8.25	8.40	8.55	...
0.48	7.18	7.47	7.54	7.68	7.83	7.98	8.13	8.28	8.43	8.58	...
0.49	7.21	7.50	7.57	7.71	7.86	8.01	8.16	8.31	8.46	8.61	...
0.50	7.24	7.53	7.60	7.74	7.89	8.04	8.19	8.34	8.49	8.64	...

inches outside diameter there is no practical difference in the collapsing pressure for lengths greater than 6 diameters up to 20 feet, it was decided to make all succeeding tests on tubes in lengths of 20 feet. The apparatus used, and the manner of making the tests of series II were the same as series I.

Derivation of Formulae for the Probable Collapsing Pressure of Lap-Welded Bessemer Steel Tubes for Lengths of Twenty Feet.

It is apparent that for tubes subjected to external fluid pressure there are three principal variables involved, the outside diameter d , the thickness of wall, t , and the fluid collapsing pressure P . Also each of these variables is a function of the other two; that is, depends jointly upon each of them for its value. A formula on the basis of three variables, when plotted, would be a surface in space, but by replacing two of these variables, t and d , by their quotient, $\frac{t}{d}$, matters were greatly simplified, since it became possible to plot the results of the tests for all diameters and thicknesses of wall on a plane surface, as given in Fig. 5.

Formula B.—By an inspection of the curve it became apparent that about 93 per cent. of the range could be represented by a straight line formula, where the thickness divided by outside diameter was more than 0.023.

On this basis, then, for values of $\frac{t}{d}$ greater than 0.023, formula B was reduced:

$$P = 86,670 \frac{t}{d} - 1386 \quad (B)$$

Where P = collapsing pressure, lbs. per sq. inch, d = outside diameter of tube in inches, and t = thickness of wall in inches.

Remembering that this same formula might also have been arrived at by the substitution of proper empirical constants in a similar formula for a theoretically perfect tube, and further, since the curve shows no apparent deviation from straightness on the upward course, it was not thought necessary to set an upper limit to the value of $\frac{t}{d}$ in the application of this formula, believing that it will give substantially correct results for all commercial lap-welded Bessemer steel tubes whose thickness divided by the outside diameter is greater than 0.023.

Formula A.—This formula for values of $\frac{t}{d}$ less than 0.023 was derived upon the assumption that when plotted the resulting curve should be tangent to the straight line representing formula B, and be also tangent to the horizontal axis at the origin. This arbitrary assumption gave a formula which represented very satisfactorily the few experiments in which $\frac{t}{d}$ was less than 0.023. The formula thus obtained is:

$$P = 1000 \left(1 + \sqrt{1 - 1600 \frac{t^3}{d^3}} \right) \quad (A)$$

This formula should be used for values of $\frac{t}{d}$ less than 0.023 and for P greater than $\frac{1}{22 \sqrt{d}}$.

Later it was discovered that a formula having a rational form with empirical constants could be substituted for the purely empirical formula A. This formula, in addition to involving theoretical considerations of elasticity, is much the simpler of the two. It is applicable only to tubes having relatively thin walls; that is, to those having values of $\frac{t}{d}$ less than 0.023, and is:

$$P = 50,210,000 \left(\frac{t}{d} \right)^3 \quad (G)$$

Either formula A or G represents satisfactorily the results of the experiments made on thin walled tubes—that is, those in which $\frac{t}{d}$ is less than 0.023, but probably formula G will permit of the greater extrapolation.

Apparent Fiber Stress on Wall of Tube at Instant of Collapse.

The following formulae were deduced to represent the most probable values of the apparent fiber stress in the

walls of the tubes constituting series II, at instant of collapse.

For values of $\frac{t}{d}$ less than 0.023:

$$S = 500 \frac{d}{t} \left(1 - \sqrt{1 - 1000 \frac{t^2}{d^3}} \right) \quad \dots \quad (E)$$

And for values of $\frac{t}{d}$ greater than 0.023:

lap welded Bessemer steel tubes taken at random from the stock,

$$S = 43,335 - 693 \frac{d}{t} \quad \dots \quad (F)$$

Where S = apparent fiber stress in pounds per square inch.

The apparent fiber stress on the wall of the tube at instant of collapse varied from about 7000 pounds per square inch for the relatively thinnest to 35,000 pounds per square inch for the relatively thickest walls.

It was shown conclusively that the ability of a commercial wrought tube to withstand a fluid collapsing pressure is not dependent alone upon either the ultimate strength or elastic limit of the material constituting it.

Relation of Point of Collapse to Length of Tube.

Theoretically a tube should begin to collapse at the middle of its length, half way between transverse joints, or end connections, tending to hold it to a circular form. This is based upon the assumption that the material of the tube is perfectly homogeneous in its physical properties and that the diameter and thickness of wall are strictly constant throughout its entire length. The strength of a tube to resist collapsing pressure depends upon the transverse rigidity of its wall and the tendency of the end connections to hold the tube to a circular form. Since the former, for the assumptions made, would be constant from end to end of the tube, and since the latter tendency would become less as the distance from an end connection increases, it is evident that a theoretically perfect tube subjected to a fluid collapsing pressure would be weakest at the middle of its length. In commercial tubes, however, the material is not strictly homogeneous, and there is also a slight variation in out of roundness of the different cross sections, from end to end, as well as a perceptible variation in thickness of wall. Because of these a commercial tube is not necessarily weakest against collapsing pressure at the middle.

The actual relation of the point of collapse to the length of tube for the several hundred commercial tubes tested varied, some collapsing nearest the 9-foot division from the left hand end of tube, and others nearest the 12-foot division. More than seven times as many of the experimental tubes collapsed at 2 feet from either end than at a point midway between the ends. The reason is evidently due chiefly to the facts that a tube subjected to collapsing pressure is weakest at the point where the departure from roundness is greatest, even when this is small, and that the greatest departure from roundness for the bulk of these tubes was near one end. The element of greatest weakness in a commercial lap welded tube is its departure from roundness, even when this is comparatively small, as was the case with the tubes tested. The thinnest portion of wall, while in itself an element of weakness, is wholly subordinate to out of roundness in its influence upon the collapsing strength.

Relation of Axis of Collapse to Smallest Diameter of Tube.

The autographic calipering diagrams taken from the tubes before being placed in the hydraulic test apparatus show that none of the tubes tested were exactly round. This departure from roundness, while measurable by the refined methods used for its determination, was nevertheless small, varying only to as much as possibly 2 per cent. of the diameter. It is apparent that, for homogeneous material and uniform thickness of wall a tube whose cross section is not circular will start to yield in the direction of its smallest diameter, and the axis of collapse will be coincident with the original smallest diameter at the place of collapse.

Relation of Axis of Collapse to the Weld.

The angular distance from the weld to the axis of collapse is quite uniformly distributed over about two-

thirds of the possible distribution and shows conclusively that the weld, in itself, is not an element of weakness for tubes that are subjected to external fluid pressure.

Relation of Axis of Collapse to the Thinnest Portion of Wall.

The tendency of commercial tubes is so to fall as to have the axis of collapse at right angles to the diameter through the thinnest portion of the tube. The bending action on the wall of a tube while being collapsed is most pronounced at this same point—that is, at 90 degrees from the axis of collapse. For commercial lap welded tubes the usual departure from roundness has a more pronounced effect in determining the manner of collapse. In other words, when these two influences are related so as to oppose each other the latter almost invariably predominates.

Application to Practice of Stewart's Formulae A and B for the Collapsing Pressures of Lap-Welded Steel Tubes.

Table of Collapsing Pressures and Weights.—The probable collapsing pressures contained in Table I were calculated by means of formulae A and B. These formulae were derived from results of tests on 20-foot lengths of Bessemer steel lap-welded tubes. They are, however, substantially correct for any length greater than about six diameters of tube between transverse joints or end connections tending to hold the tube to a circular form. In the columns headed "C. P." are entered the probable collapsing fluid pressures in pounds per square inch, as calculated by formulae A and B, while in columns headed "Wt." are entered the corresponding plain end weights in pounds per foot length. It will be noted that each weight column and the corresponding collapsing pressure column taken together constitute a double column that is headed by the outside diameter of the tube to which this double column corresponds.

Factors of Safety.—These tabular values represent the probable collapsing pressures as based upon the tests, but any individual tube is as likely to fail above as below this most probable pressure. Not one of the several hundred tubes tested failed at a pressure lower than 42 per cent. of the probable collapsing pressure, while $\frac{1}{2}$ of 1 per cent. of the number of tubes failed at 37 per cent. and 2 per cent. at 25 per cent. of that pressure. In other words, with an actual factor of safety of 1.75, not one of the tubes tested would have failed.

For the most favorable practical conditions—namely, when the tube is subjected only to stress due to fluid pressure and only the most trivial loss could result from its failure—a factor of safety of three would appear sufficient. When only a moderate amount of loss could result from failure use a factor of four. When considerable damage to property and loss of life might result from a failure of the tube then use a factor of safety of six. When the conditions of service are such as to cause the tube to become less capable of resisting collapsing pressure, such as the thinning of wall due to corrosion, the weakening of the material due to overheating, the creating of internal stress in the wall of the tube, due to unequal heating, vibration, &c., the above factors of safety should be increased in proportion to the severity of these actions.

Chart Showing Relation of Collapsing Pressure to $\frac{t}{d}$.

Fig. 5 resulted from plotting equations A and B to a vertical scale of probable collapsing pressures and a horizontal scale representing the thickness of the tube divided by its outside diameter, or the $\frac{t}{d}$ contained in these formulae. By plotting in this manner a single line may be made to represent the collapsing pressures of a great variety of tubes, irrespective of their individual diameters or thicknesses of wall. To condense the size of this chart the curve is broken into the two parts X X and Y Y. Y Y is the upper portion of X X transferred to the left and then dropped down, the break in the curve corresponding to a collapsing pressure of 2080 pounds and a thickness divided by diameter of 0.040. The scales for the portion X X are at the lower and right hand margins, while those for the portion Y Y are at the upper and left hand margins. The smallest divisions on the vertical

scale represent 10 pounds collapsing pressure, while those on the horizontal scale represent 0.0002 thickness divided by outside diameter. When reading to the nearest smallest division on these scales the error will not exceed 5 pounds for probable collapsing pressure, nor 0.0001 for thickness divided by outside diameter.

This, then, is a universal chart showing the relation of the probable collapsing pressure of a tube to the thickness of wall divided by outside diameter. It represents the values of all the 20-foot lengths of the Bessemer steel lap welded tubes tested and may be used with entire confidence within the range of these experiments—that is, for Bessemer steel lap welded tubes from 2 to 12 inches outside diameter and for all commercial thickness of wall in lengths greater than about six diameters of tube between joints or end connections tending to hold them to a circular form.

Linear Units for d and t .—It should be noted that both the outside diameter d and the thickness of wall t must be expressed in the same linear unit of measure, as, for example, in inches, centimeters, millimeters, &c. The chart is just as applicable to obtaining probable collapsing pressures in pounds per square inch when the diameter and thickness are expressed in metric as when in English units.

Chart Showing Relation of Collapsing Pressure to $\frac{w}{d^2}$.

Fig. 6 resulted from plotting to a vertical scale of probable collapsing pressures and a horizontal scale representing the plain end weight per foot divided by the square of

the outside diameter, or the $\frac{w}{d^2}$. The errors of reading this chart should not exceed 5 pounds for the probable collapsing pressure, nor 0.001 for the weight divided by the square of the outside diameter. This chart is based upon the same experimental data as chart (Fig. 5), the difference being that for any given size of tube this chart shows the relation of the probable collapsing pressure to the plain end weight, while the preceding chart shows its relation to the thickness of wall. This chart should be used in calculations relating to collapsing pressure when the plain end weight is either given or required, while the preceding chart should be used when the thickness of wall is given or required.

The Bethlehem Steel Corporation.

In the issue for April 5 was published the preliminary statement of the Bethlehem Steel Corporation for the year ending December 31, 1905. The full report has now been issued, from which is taken the general balance sheet as of December 31, 1905, as follows:

<i>Assets.</i>	
Property account.....	\$32,001,264
Raw material, supplies, &c.....	2,794,133
Worked matter and contracts in progress.....	4,088,137
Accounts receivable (net).....	2,300,147
Notes and bills receivable (net).....	245,415
Advanced and accrued interest.....	125,116
Marketable securities.....	557,196
Due from receiver United States Shipbuilding Company.....	150,856
Cash on hand, &c.....	571,237
Cash on special deposit for retirement bonds.....	874,386
Deferred charges to future operations.....	150,295
Total.....	\$43,858,182
<i>Liabilities.</i>	
Preferred stock.....	\$14,908,000
Common stock.....	14,862,000
Bonded debt subsidiary companies.....	1,351,000
Bethlehem Steel purchase money bonds.....	7,408,000
Notes payable.....	1,059,000
Accounts payable.....	1,349,196
Payrolls accrued.....	875,555
Bond interest accrued.....	123,645
Provision for accruing and other liabilities.....	97,494
Depreciation fund.....	400,000
Reserve fund.....	80,671
Profit and loss surplus.....	1,843,619
Total.....	\$43,858,182

The net earnings for the year were \$2,365,399, and the surplus carried forward after preferred stock dividends was \$1,843,619. During the year \$3,600,000 collateral trust 6 per cent. bonds were paid off, while the Bath Iron

Works and the Hyde Windlass Company of Bath, Maine, were sold.

It is expected that the extensions to the property of the Bethlehem Steel Corporation, which will involve the expenditure of about \$12,000,000, will be completed in about a year and a half, or possibly less. These extensions will give the company a much larger capacity, as well as strengthen its earning power on additional charges of about \$600,000. These extensions provide for the manufacture of open hearth steel rails, structural shapes of a special design and other high grades of steel.

Chairman Charles M. Schwab's statement to the stockholders is in part as follows:

"For some years large amounts have been expended from the earnings of the Bethlehem Company in carrying out a programme embracing extensive improvements and additions to what is now known as the old plant, as a result of which the capacity of the plant has been largely increased and new lines of manufacture established, notably drop forgings, staybolt iron and crucible steel. During the past year there was appropriated for these improvements and additions a total of \$2,990,765, and there was expended on account thereof \$2,013,732.

"A careful study of the situation at this plant convinced the officers and directors that a still further development was desirable, and it was determined to continue the increase of the old plant, particularly in blast furnace capacity, as well as to establish a new plant to be devoted to the manufacture of open hearth steel, structural shapes, rails and billets. For this purpose about 250 acres of land adjoining the old plant was purchased and plans for the new furnaces, mills, to be erected thereon, definitely adopted. This work is now being pushed rapidly. It is expected that a portion of the new plant will be productive during 1907. The maximum production of structural material and rails, after the improvements contemplated have been completed, will be about 500,000 tons per annum, while the maximum output of pig iron will be approximately 600,000 tons per annum.

"The mines of the Juragua Iron Company [in Cuba] form the principal source of ore supply for the Bethlehem plant, and considerable money was spent during the past year in developing the property and placing it in shape for large and economical production. Other ore properties within proper geographical location of Bethlehem are being investigated with a view to future reserves and, similarly, coal and limestone deposits, with a view to the independent control of the necessary supply of raw material."

The American Society for Testing Materials.

The ninth annual meeting of the American Society for Testing Materials will be held at Atlantic City, N. J., June 21 to 23. Announcements of papers to be read will be made in due time. The secretary, Professor Edgar Marburg, Philadelphia, notes that the next congress of the International Association for Testing Materials, with which the American Society is affiliated, will be held at Brussels, Belgium, September 3 to 8, 1906. Of a total of 786 members of the American Society for Testing Materials, 240 are members of the International Association. Fifteen papers are scheduled to be read at the Brussels congress, the list including the following: "Methods for the Examination of Welding and Weldability," by Prof. Reinhold Krohn; "Report on the Progress of Metallography Since the Congress at Budapest in 1901," by F. Osmond and G. Cartaud; "Methods of Testing Pipes," by Prof. M. Gary; "Methods of Testing the Protective Power of Paints Used on Metallic Structures," by E. Ebert; "Raw and Boiled Linseed Oil," by A. Grittner.

It is understood that the independent manufacturers of sheets and tin plates will ask the Amalgamated Association for a reduction of about 14 per cent. in wages for the scale year commencing July 1. The independent mills claim that on account of the high prices they are paying for sheets and tin bars it is impossible to continue to pay present wages and make any money. The request will no doubt be vigorously opposed by the Amalgamated Association.

1905, against 84,934 tons in 1904, and in another item wire and products of wire, which amounted to 1,283,943 tons in 1905 and 1,226,610 tons in 1904. It would seem from these figures that unless the Corporation carried a large stock of wire rods at the close of 1905 its production of wire rods in that year was not as large a percentage of the total as in 1904. In the latter year it reported to the American Iron and Steel Association 1,212,012 gross tons of rods produced, or 71.3 per cent. of the total.

The chief feature of interest in the wire product statistics for the country for 1905 and preceding years is in the story they tell of a very important increase in the consumption of wire and of wire products other than nails. We have taken for the purpose of this comparison, the statistics from 1899, the year the original American Steel & Wire Company was formed. In one column of the table below is given the production of wire rods. In the next column is the production of wire nails reduced to gross tons. In the third column are the exports of rods, wire and wire nails. The last column represents the difference between the rod output and the total of the exports and the wire nail production, less wire nail exports. In other words, if waste were deducted—scale, the iron in sulphate of iron and the scrap—the last column would stand for the home consumed production of wire and wire products, excepting nails. Disregarding the factor of waste, these figures show that wire products apart from nails have more than doubled in six years:

Production of Wire Products in the United States and Exports.
Gross Tons.

	Production rods.	Production wire nails.	Exports rods and wire products.	Home consumed products, except nails; also waste.
1899.....	1,036,398	340,095	166,820	562,994
1900.....	846,291	322,945	116,070	434,580
1901.....	1,365,934	437,670	115,076	831,861
1902.....	1,574,298	490,279	148,986	961,658
1903.....	1,503,455	429,985	162,467	942,501
1904.....	1,699,028	532,440	171,478	1,027,903
1905.....	1,808,688	484,593	184,959	1,174,972

A recent article in *The Iron Age* dealing with the successive developments marking distinctly new uses for steel referred to the important tonnage going into wire products. In former years the displacement of the iron cut nail by the steel wire nail was going on at an accelerating rate, but for some years this has not been marked, though the wire nail has shown an important increase, due to the growth of the country and the cheapening of the product. A very considerable percentage of the increase in wire rod production, however, has been contributed by the rapidly extending use of woven wire fencing. It is estimated that in 1899, when the American Steel & Wire Company was organized, the production of woven wire fencing in the United States amounted to 40,000 tons. In 1905 it is estimated that 275,000 tons of smooth woven wire fencing were produced, making a sevenfold increase in six years. A reliable estimate of the barb wire production of 1905 is 250,000 tons, of which about 25,000 tons went abroad. These estimates give a total of 525,000 tons of the wire mill product of last year that was consumed in the form of fencing. As the wood fencing that belonged to the last generation has required renewing, both the scarcity of timber and the high labor cost of the rail fence that used to be almost the sole method of marking farm boundaries have combined to bring the woven wire or barb wire product into vogue. Railroad use of wire fencing along right of way has been an increasing factor in recent years.

When it is considered, moreover, that this expansion in the use of smooth wire fencing has accompanied a decrease in the total going into barb wire it can be appreciated how the multifarious new uses of wire have been

piling up tonnage in the past six years. Wire cable consumption has been conspicuously heavy, due to the marked mining development and to the increased use of aerial conveying systems. There has come also a multitude of small contributors to the wire trade, each apparently inconsiderable, but making a great aggregate. The substitution of wire for wood hoops on barrels represents 1000 tons of wire a month taken by one consumer alone. Wire has been increasingly in use for the manufacture of small cold worked bolts and rivets. The aggregation of littles probably represents no less than 25 per cent. of the tonnage in the last column of our table, and from this standpoint it is an impressive exhibit of the scarcely perceptible yet irresistible advance of steel.

Late Blast Furnace and Open Hearth Records.

The Duquesne blast furnaces of the Carnegie Steel Company in March of this year established a new world's record for the output of four blast furnaces in one calendar month by making 78,120 tons of 2240 pounds of regular pig iron, exclusive of 2473 tons of ladle and other scrap. The previous record was 77,242 tons, made in March, 1905, by D, E, J and K of the Edgar Thomson furnaces. This broke the record made in October, 1904, of 74,605 tons by the Duquesne furnaces. The previous record had been 74,192 tons, in January, 1902, but furnaces from three separate groups had to be selected in order to make this record, there being one Edgar Thomson, one Youngstown and two Carrie.

The Duquesne blast furnaces are the oldest of the modern large stacks, having made their first blasts in the period from June 8, 1896, to June 21, 1897, so that they are nearly ten years old. With so many new and large furnaces built in the past few years it is important to note that these Duquesne furnaces were out of the reckoning when the record of January, 1902, was made, and yet now hold the latest record. The performance involved the consumption of an average of only 2025 pounds of coke per ton of pig iron, and it appears that the production of flue dust was relatively small.

It has been quite the custom for nearly ten years to speak of nearly every new large furnace built as a "600-ton stack." The designation is hardly correct, seeing that to make the world's record here noted the Duquesne furnaces produced only an average of 630 tons per furnace per day. Certainly the average daily output of the so-called 600-ton furnaces is considerably under this figure.

The average output of the coke and anthracite blast furnaces in the United States actually in blast in 1905 was 82,985 gross tons, or 227 tons per day. This average is reached by dividing the total make of coke and anthracite furnaces by the average number of furnaces in blast as shown by our monthly statistics, the number in blast on January 1, 1905, and January 1, 1906, being given a weight of one-half, the figures for intermediate months being given full weight. This certainly gives quite an exact basis for computation to show the average make of furnaces while they are actually in blast. The make of an individual furnace would be less in the long run, because it would have to stand its periods of idleness, which these figures eliminate. Of course this average of 227 tons per furnace per day has been pulled down by the anthracite furnaces and by many stacks which are small because they are old or because their raw materials do not warrant large stacks. The average make of the really large furnaces is probably in the neighborhood of 500 tons per day.

It may be noted, incidentally, that the average make of 82,985 tons per furnace in 1905 compares very favor-

ably with outputs abroad. The London *Iron and Coal Trades Review* a few months ago represented the average make per furnace in blast, using 1903 statistics, at 26,100 tons for Great Britain, 34,745 tons for Belgium, 41,000 tons for Germany and 24,800 tons for France. These figures are understood not to exclude charcoal furnaces where they exist, while our figures for the United States make this exclusion.

Five other groups of blast furnaces operated by the Carnegie Steel Company broke their records in March, with the following outputs for the month:

Carrie (5).....	66,520
Ohio (4).....	63,633
New Castle (4).....	61,093
Mingo (3).....	47,354
South Sharon (3).....	40,015
Nineteen furnaces.....	278,615

This was 14,664 tons per furnace for the 31 days and 473 tons per furnace per day. These furnaces are not all of the largest size. Eleven different sizes are represented. There are nine which are 100 feet or more high by an average of more than 22 feet maximum bosh diameter, five of 90 feet or higher by about 20 feet, four 85 feet high by about 20 feet diameter and one little stack 75 x 17 feet.

The summary of new records made by Steel Corporation plants in March printed in *The Iron Age* of April 19 contained other interesting details. Several of the open hearth steel plants broke their records of ingot production. Those which did so, and which comprised none but 50-ton furnaces, are given below, with the number of furnaces and the month's output in ingots:

Plant.	No. furnaces.	Plant's output. Gross tons.
Duquesne	14	50,297
Clairton	12	53,014
Donora	12	46,469
South Sharon	12	52,015
Totals	50	201,795
Average per furnace.....		4,036

This is an average of 75 tons per furnace per 12 hours, or 150 tons per 24 hours, counting 27 days' operation. It is almost as common to hear a 50-ton furnace spoken of as having an output of not much over 100 tons per 24 hours as it is to hear of the "600-ton stacks" already referred to. In the case of the open hearth furnaces the popular assumption is quite below the mark, as established by the four plants named above, which in the main are not substantially different from the general run of open hearth works.

The Foundry Trade School.—Edward A. Johnson of the University of Minnesota has been appointed to take charge of the new school for foundrymen at the Winona Technical Institute, Indianapolis, Ind. A committee, including O. P. Briggs of Minneapolis, president of the National Founders' Association; William Gilbert of Cincinnati, and J. L. Ketcham of Indianapolis, recently met with S. C. Dickey, president of the institute, and let a contract for the new \$10,000 building, which will house the school. It will be 58 x 120 feet and will be equipped for practical foundry work. The building is to be completed by May 20. Mr. Johnson will at once begin organizing the school work, so that the department may open as soon as the building and equipment are ready. The association has voted \$3000 a year to the school.

In a suit between the Brylgon Foundry Company, formerly of Reading, Pa., and Powell & Colné, agents for the Tropenas converter steel process, New York, for breach of contract for using the process, the lower court at Reading decided in favor of Powell & Colné, and upon appeal to the Supreme Court of Pennsylvania it affirmed the judgment, with costs.

The Trademark Bill Becomes a Law.

WASHINGTON, D. C., May 1, 1906.—The Senate has passed the Currier trademark bill providing important amendments in the Bonyne trademark act, which took effect April 1, 1905, and the measure having already gone through the House, as stated in *The Iron Age* for April 26, it will be sent to the President for signature as soon as the House has formally concurred in a minor amendment made by the Senate. The bill as it went through the House provided that it should take effect immediately upon its passage, but both House and Senate committees have received numerous suggestions that a few weeks' notice should be given to manufacturers, dealers and other trademark owners of the changes in the law embodied in this measure, and the Senate committee therefore drafted an amendment providing that the new act shall go into force July 1, next. The Senate adopted this amendment, and there is little doubt the House will concur therein.

Classification of Merchandise.

The most important of its provisions is that providing for a classification of merchandise, and manufacturers will follow with interest the work of the Patent Commissioner in arranging this classification. According to statements filed with the House Committee on Patents while this measure was pending before it, the British classification is made up of 50 classes, 49 of which are specific and 1 miscellaneous. The British Patent Office publishes in this connection a guide to the classification of goods, in which are alphabetically arranged all the articles which have thus far been classified and in the accompanying regulations the following statement is made:

If any person intending to apply for registration of a trademark is, on examining the following enumeration of goods, uncertain as to the class to which his goods belong, he should send to the Comptroller-General, giving a full description of the goods and of the purpose for which they are used. He will then be informed of the class he should name in his application.

The same general practice is followed by the International Bureau for the classification of trademarks. Probably the most complete classification is that provided by the French law, which was passed in 1857, and which in spite of the progress in many of the industrial arts is still sufficiently comprehensive to be entirely practicable. This law provides 74 classes. The international classification will probably be urged upon the Commissioner of Patents because of the importance of harmonizing the trademark practice throughout the world. This code embraces 80 classes, those of chief interest to the readers of *The Iron Age* being as follows:

I. *Raw Materials.*—7. Minerals, earths, uncut stone, coal, coke and briquettes.

II. *Partly Manufactured Materials.*—8. Metal in bulk, ingots, bars, sheets, plates, wire, scrap. 12. Explosives, powder, squibs, fuses, matches, fireworks.

III. *Tools, Machinery, Carriages.*—16. Hand and machine tools, sewing machines and parts, mills of all kinds. 17. Agricultural machinery, instruments for tillage and their parts. 18. Steam engines and parts of steam engines. 19. Sheet metal ware, tubing, metal casks and vessels. 20. Electricity (machines and accessories). 21. Time-keeping instruments. 22. Machinery of all kinds and parts of machinery (not otherwise classified). 23. Naval architecture and naval accessories. 24. Railroad equipment and rolling stock, locomotives, rails. 25. Carriages and wagons, farmery, automobiles and velocipedes. 28. Military and sporting firearms and ammunition.

IV. *Construction.*—31. Beams, &c., for metal construction. 32. Hardware, ironware, locks, nails, screws and bolts, chains, sandpaper, emery cloth and polishing preparations. 35. Heating and ventilating apparatus, elevators.

V. *Furniture and Household Articles.*—38. Tinware, cooking utensils, bathtubs, filters. 39. Articles for lighting, heating and cooking. 42. Cutlery, edge tools, swords.

IX. *Education, Sciences, Fine Arts and Miscellaneous.*—80. All articles not otherwise classified.

The practical effect of the classification provision may be gathered from the fact that a single hardware company has already been obliged to register its trademark 11 times to cover classes of goods which formerly would have been embraced within two classes. The cost of procuring the registration of a trademark, including attorney's fee, ranges from \$25 upward; hence the difference in expense is an important item.

Movement for Criminal Law.

The movement to secure the passage of a law making the willful infringement of a trademark a criminal offense is rapidly gathering force and an effort is now being made to transfer the campaign from the House to the Senate, and to induce the Senate Committee on Patents to take the initiative, owing to the apparent reluctance of the House committee to complicate its own programme by reporting a bill creating an additional offense against the federal statutes. Senator Dryden of New Jersey, who represents a manufacturing constituency of enormous proportions, including many large concerns in the metal trades, has become interested in the matter and has introduced in the Senate a measure intended to form the basis of the proposed law. His bill is similar to the measure introduced in the House by Representative Wiley of New Jersey, but which the House has thus far failed to act upon. The specific offense is created by this bill in a proposed amendment to Section 16 of the Bonyne trademark act, which went into force April 1, last. The Dryden bill provides as follows:

That any person who shall wilfully and with intent to defraud transport or cause or procure to be transported between the States, or to or from any foreign nation or Indian tribe, or shall deliver to any carrier to be so transported, any goods not those of the owner of the trademark, but of the same or substantially the same descriptive properties as the goods for which the said trademark is registered and upon which the same is used by the owner thereof, to which or to the packages or receptacles containing which is affixed any trademark registered pursuant to the provisions of this act, or any false representation, likeness, copy or colorable imitation, shall on conviction thereof be punished by a fine not exceeding \$1000 or by imprisonment for not more than two years, or by both such fine and imprisonment.

The measure further provides that in any suit for infringement by a party failing to give notice of registration no damages shall be recovered except on proof that the defendant was duly notified of infringement and continued it after such notice. No criminal prosecution shall be maintained in the absence of such notice, except on similar proof.

Demand For Legislation.

The demand for the passage of trademark legislation such as is embodied in the Dryden bill appears to be almost universal in all lines of industry, but especially in the hardware and metal trades, in which a trademark, representing years of effort to perfect high grade products and to extend their reputation throughout the world, is an asset of high value. There is nothing in the constitution or in the rules of either house to prevent the Senate from taking the initiative in the matter; hence the effort to induce that body to take up the Dryden bill.

W. L. C.

Manufacturers Inspect Niagara Falls Power Plants.

The boards of trade of Niagara Falls, N. Y., and Niagara Falls, Ont., April 28 entertained a large number of prominent manufacturers and capitalists, who visited Niagara Falls in response to their invitation to learn just how much the two cities had to offer in the way of cheap electric power, manufacturing sites and shipping facilities. The entire day was spent in inspecting the plants of the different power generating companies and many of the industries located in the vicinity of the Falls. The events of the day were brought to a finale by a banquet at Mount Saint Carmel Hospice, on the Canadian side just above the Horseshoe Falls, which was followed by after dinner speeches by Harold Buck of the Niagara Falls Power Company; Calvin W. Rice of Schenectady, representing the General Electric Company; Paul M. Lincoln of Pittsburgh, representing the Westinghouse Company, and Edward Gurney of Toronto, Canada, a former president of the Manufacturers' Association. The attendance was large, there being nearly 500 hundred plates laid. In addition to the manufacturers and representatives of industrial plants many other business men of Niagara Falls and Buffalo were present. Among the cities represented were Boston, Providence, Fall River, Springfield and other New England places, as well as Cleveland, Indian-

apolis, Terre Haute, Toronto and Hamilton. Every member of the visiting party was either a president, vice-president, general manager or proprietor of industrial plants depending for success upon cheap and unfailing power.

New Publication.

Iron and Steel and Other Alloys. By Henry M. Howe. Second edition. First edition somewhat revised and enlarged. Pages, 495. Price \$5. Published by Albert Sauveur, Cambridge, Mass.

In preparing this edition the author has made a few minor corrections and other changes in the first edition, with additions which have increased the number of pages from 457 to 495. The new matter includes the classification and definitions of iron and steel which the author and Professor Sauveur made for the International Association of Testing Materials. There are also descriptions of the Roe mechanical puddler, the Mond gas producer and the Gayley dry blast process. The part in the first edition relating to the transition substances, martensite, troostite and sorbite, have been rearranged. The author explains why, though with some misgivings, he has treated these transition substances as simply mechanical mixtures, in varying proportions and varying states of aggregation, of the three known primary substances, austenite, ferrite and cementite. The discussion of the Gayley dry blast covers a number of pages. It deals particularly with the importance of initial gas temperature in heating processes with a critical temperature, and also emphasizes the importance of the critical temperature in the blast furnace process. The author explains at some length why drying the blast causes a saving of fuel out of proportion to the quantity of heat which the heating and dissociation of the moisture directly require. He reaches the conclusion that the excess of coke apparently needed in the hearth in case of moist blast is actually needed; that of all of the heat which its combustion develops only that represented by the narrowed margin between combustion temperature and critical temperature can be utilized, with the exception of that used in heating the coke itself to the critical temperature, so that the rest of this heat is wasted.

Credit is given to J. E. Johnson, Jr., as being the first to point out clearly the importance of the critical temperature in the blast furnace process. It is stated that the explanation of the great saving of fuel by the Gayley dry blast process accounts also for the fact that the saving which Neilson's invention of the hot blast effected and every saving later made by further heating the blast were so greatly out of proportion to the quantity of heat thus given to the blast. The same reasoning also applies to the fact that the heating of the blast was immediately followed by a drop in the temperature of the escaping gases and a rise in the ratio of carbon dioxide to carbon monoxide. Professor Howe's original work, under the above title, was issued in 1903 and was a noteworthy contribution to the metallurgy of iron and steel, covering the important developments of recent years in respect to heat treatment and the revelations of metallography.

Double superheating in a 60 horse-power portable compound engine has given eminently satisfactory results, the steam consumption at 219 revolutions per minute, 178 pounds boiler pressure and 55 horse-power having been 9.55 pounds per horse-power hour. It was found that the temperature of the cylinder walls was well maintained by the superheat and that the rarified steam would not part with its heat nearly so readily as does saturated steam, and the heat interchange with the walls was diminished in spite of the greater temperature range. In this engine the high pressure cylinder and valve chest are placed in the upper or coolest part of the smoke box, in which are also placed the two superheaters, one for the high pressure cylinder and the other for the low. The low pressure cylinder is mounted on the boiler and jacketed with boiler steam. The gases had a temperature of 370 degrees when leaving the fire tubes, but only 191 degrees (both Centigrade) when leaving the position of the high pressure cylinder.

Trade Publications.

Steel.—Halcomb Steel Company, Syracuse, N. Y. Catalogue and Hints on Steel. Size, 4 x 6 inches; pages, 88. Cloth bound. The company's products are tool and high grade steel in bars, sheets, strips, drill rods, wire, hot rolled shapes, forgings and cold drawn shapes to accurate size, and a specialty is made of high grade tool steel. Among the special brands of steel made are the Halcomb high speed tool steel, particularly adapted for turning, planing and shaping tools; punches, boring tools, cutters, drills, &c.; air hardening tool steel for boring, slotting, planing and turning at high speed; double special tool steel, for cutting tempered steel, chilled iron, glazed locomotive tire, &c., or for tools not intended to withstand shocks; special tool steel, for turning, planing and slotting hard materials, and for expensive cutters, drills, taps, reamers, punches, &c.; double extra tool steel, for general use; extra warranted tool steel, mainly intended for wood and stone working tools; standard tool steel, for all ordinary purposes, including rock and mining drills, hammers, chisels, swages, track tools, &c., and Halcomb Ketos oil hardening steel, made especially for milling cutters, taps, reamers, ball bearings, &c. In connection with each kind of steel is given a little discussion of its treatment. One section contains hints as to tempering, annealing, forging, hardening, welding, &c., and another section deals with nickel and special alloy steels. A discussion of the best steel for special purposes follows, including the steel suitable for all manner of hardware and common tools. Tables of sizes, standard rods and other shapes are given. Cold drawn bar and hot roll sheet steel are listed, and also file and spring steel, crucible machinery steel, open hearth machinery steel, &c. The last few pages contain wire gauges and other tables of useful information bearing on the subject covered in the catalogue.

Trolleys.—The General Pneumatic Tool Company, Montour Falls, N. Y. Mailing card. Shows a cut of the Shepard trolley for mounting on an I-beam, and enumerates its advantages.

Conveying and Handling Plant.—C. W. Hunt Company, West New Brighton, N. Y. Pamphlet 061. In a way this is an index to the general line of machinery manufactured by the company, and does not pretend to give more than a portion of the manufactures. For example, illustrations are shown of steeple towers, elevators, steam shovels, coal crackers, coal tubs, blocks and sheaves, cable railways, automatic railways, hoisting engines, electric hoists, conveyors, trolleys, industrial railways and electric locomotives.

Injectors.—Hayden & Derby Mfg. Company, 85 Liberty street, New York. Pamphlet. A description of Metropolitan injectors in general is followed with detailed description, specifications, price-list and dimensions of automatic injectors, models N, S and N. & S; 1898 injectors, models O, T, O & T & G, and O & T; double tube injector, models G, and H-D ejectors; models P, P & C, C and R. The concluding pages deal with the H-D noiseless water heaters, strainers and funnels, and Hancock swing check valves.

Direct Current Motors.—Sprague Electric Company, 527 West Thirty-fourth street, New York City. Bulletin No. 224. Contains an illustrated description of the company's high speed direct current motor, covering the parts in detail. The motors are made in open, semi inclosed and inclosed types, in sizes of from 7½ to 90 horse-power. A similar motor is made in vertical type where it is desired to place the shaft perpendicularly. Illustrations in the latter part of the bulletin show a number of applications of the motor.

Water Wheels.—Abner Doble Company, San Francisco, Cal. Catalogue; size, 6 x 9 inches; pages, 110. This publication is more than a catalogue, in that it contains a great deal of information useful to hydraulic engineers. The principle of the Doble wheel is fully explained, and the construction of the ellipsoidal bucket is well shown in numerous illustrations. In similar fashion all of the separate parts of the wheel are treated, and particular emphasis is laid on the course of the needle regulating nozzle, upon which the strongest claims for efficiency are based. Following a general discussion of the wheel, considerable space is given to electric generating units driven by Doble water wheels. An interesting part describes several typical installations of Doble wheels, including one in the experimental hydraulic laboratory at Cornell University. Weir tables and very complete water wheel tables are also given. Other tables of useful information cover the loss of head in pipe by friction, dimensions and strength of riveted hydraulic pipe, and various formulae necessary in hydraulic engineering calculations.

Well Drilling Machinery.—Austin Mfg. Company, 315 Dearborn street, Chicago, Ill. Catalogue No. 4, edition B. Size, 7½ x 10½ inches; pages, 64. Concerns well drilling and prospecting machinery for water, oil, mineral or gas, and for any size or depth. Ten styles of portable well machinery are shown in the catalogue, these having a capacity of from 250 to 2000 feet. All the tools and parts necessary to a complete equipment are listed.

Ferro Alloys.—George G. Blackwell, Sons & Co., Limited, Liverpool, England. Pamphlet, fourth edition of "Electric Furnace High Grade Alloys." Calls attention to the company's ferrochromium, ferrotungsten, ferromolybdenum, ferrovandium, ferrotitanium, ferronickel, molybdenum chrome, molybdenum

nickel and chrome nickel alloys. Gives information of interest to manufacturers of high speed steels and special steels in which strength and hardness are secured by the addition of various percentages of ferro alloys. The company has an extensive electric furnace plant with a maximum of 42,000 horse-power and owns and operates its own ore mines. The alloys and metals are known as the "Lion" brand. The company claims to have reduced considerably the cost of producing ferro-vanadium. Several pages are devoted to the use of ferrosilicon, ferromanganese and manganese silicon alloys in foundries. Ferro-phosphorus, several thousand tons of which have been delivered in the United States and elsewhere, is useful in the basic process for enriching the slag. It has also been found that under certain conditions carbon and phosphorus may replace each other and that by lowering the carbon and raising the phosphorus the steel rolls with a better finish, the product from the rolls having a skin which is not found in lower phosphorus, higher carbon steel.

Boiler Brick.—Harblson-Walker Refractories Company, Pittsburgh, Pa. Pamphlet. Title, "A Little Talk on Brick for Boiler Settings." Contains suggestions on the economy of using high grade refractory material. In view of the time lost by repairs and the higher fuel consumption resulting from the burning out of arches, also the cases of failure of brick in boiler arches and bridge walls to stand up well where care has not been exercised in the work of construction, the pamphlet gives the following hints as to methods of getting the best results from boiler settings: "Brick should be laid in that portion of the setting for which they are intended to be used, as conditions vary in different parts of the setting and brick are varied to meet conditions. The clay used should always be of same grade as the brick that are laid with it. This is important, as one of the frequent sources of trouble is the use of inferior clay to lay brick. Clay should be mixed to a thin soup and brick dipped in it, then rubbed to insure a brick-to-brick joint. Not more than 300 to 350 pounds of clay should be used with 1000 brick. All bricklaying should be as even as possible, so as to avoid projecting brick, which catch the flame. A perfect arch or circle over the fire will last almost indefinitely. Heating up and cooling down slowly adds very much to the life of the brick work. Cutting of brick should be avoided as much as possible, and regular 9-inch shapes, such as skew, arch, wedge, soapplit, key, &c., used instead of cutting 9-inch straights. A cut brick is never as good as a whole brick."

Aluminum Castings.—The Light Mfg. & Foundry Company, Pottstown, Pa. Pamphlet. Deals with automobile brand aluminum, manganese and phosphor bronze castings, so called on account of their extensive use in automobile construction. The illustrations show parts of an automobile which are made in aluminum. A useful part gives suggestions in planning for the use of aluminum castings, referring particularly to the considerations which should be taken into account in making patterns.

Reducing Wheels.—Crosby Steam Gage & Valve Company, Boston, Mass. Circular. Shows the Crosby reducing wheel for attaching directly to a steam engine indicator to give the reducing motion.

Gasoline Engines.—Perkins Wind Mill Company, Mishawaka, Ind. Catalogue No. 40. Size, 4½ x 8 inches; pages, 72. It presupposes little knowledge of gasoline engines on the part of the reader, and enters into an extended discussion of the theory and construction of gasoline engines. An account of the Perkins vertical gasoline engine follows, which is complete with respect to the parts entering into it. A similar treatment is given of the Perkins horizontal engine, and then a variety of applications are shown, such as the driving of pumps and pumping heads, farm machinery, &c. The last few pages show such machinery as speed grinders, cob crushers, corn shellers, wood saws, meat choppers, &c.

Centrifugal Pumps.—The American Well Works, Aurora, Ill. Bulletin No. 96. Devoted to the American centrifugal pump, one claimed to be of high mechanical efficiency and moderate price. Vertical and horizontal patterns are illustrated and tables of capacities are given. Useful information is given concerning the installing of centrifugal pumps, and data with respect to economy of centrifugal pumps as compared with direct acting steam pumps is made a feature.

Foundry Equipment.—Whiting Foundry Equipment Company, Harvey (Chicago), Ill. Sectional catalogue. Sections are of uniform size and are arranged for binding in the cover which is furnished. Each booklet is devoted to a specific description of and valuable data concerning one product of the company's plant. One pertains to cranes of all descriptions, another covers air hoists, another cupolas, another ladles, &c.

Calendars.—The Laclede Fire Brick Mfg. Company, St. Louis, Mo., announces that it still has a number of the "Little Red Devils" calendars for distribution. The calendar is 18½ x 27 inches.

Screw Plates.—E. F. Reece Company, Greenfield, Mass. Pamphlet. The cover represents the outside of a screw plate box, and the subject matter inside describes Reece screw plates, Reece adjustable guide stock, adjustable dies, and gives a condensed price-list of the screw plates and a price-list of taps and dies for the screw plates.

The Machine Tool Builders' Convention.

ATLANTIC CITY, May 2, 1906.—The spring meeting of the National Machine Tool Builders' Association was held at Atlantic City, N. J., yesterday and to-day, with sessions at the Chalfonte, where the members and their guests were quartered. The social side of the meeting was a pleasant one, many of the members having their wives with them. The entertainment of the ladies included an automobile tour of the famous resort on Tuesday afternoon, which was much enjoyed, the day being perfect.

Tuesday morning was given over to preliminary work, and to a paper by Murray Shipley of the Lodge & Shipley Machine Tool Company, Cincinnati.

President E. M. Woodward, Worcester, was in the chair, and with Secretary Paul E. Montanus, Springfield, Ohio, repeated the expeditious transaction of business which characterized the December meeting in New York.

The early afternoon was devoted to meetings of the several sections. The planer builders made the important announcement to the subsequent general meeting in the late afternoon that it had been voted to advance prices on planers 5 per cent. This advance on planers is in addition to a 5 per cent. advance made at the December meeting. The shaper section announced that it had voted to advance prices 5 per cent. While there had been previous advance on this class of machine, the new advance is the first concerted action. A very important element in the advances is that they are based on resale or consumers' prices, from which discount to the jobber will be made. The upright drill section had previously met in Chicago, and advanced prices, as was announced in *The Iron Age* of last week.

These committees were appointed: Resolutions—Fred A. Geier, A. W. Whitcomb and Israel H. Johnson, Jr. Press—President E. M. Woodward and Secretary P. E. Montanus. Auditing—J. B. Doan and H. L. Flather. By-laws—President Woodward, Secretary Montanus and B. B. Quillen. The members present were:

P. E. Montanus, Springfield Machine Tool Company, Springfield, Ohio.
 W. P. Davis, W. A. Davis Machine Company, Rochester, N. Y.
 E. M. Woodward, Woodward & Powell Planer Company, Worcester, Mass.
 H. J. Hendey and C. H. Alvord, Hendey Machine Company, Torrington, Conn.
 A. H. Tuechter, Cincinnati Machine Tool Company, Cincinnati, Ohio.
 B. B. Quillen, Cincinnati Planer Company, Cincinnati, Ohio.
 J. B. Doan, American Tool Works Company, Cincinnati, Ohio.
 C. H. Norton, Norton Grinding Company, Worcester, Mass.
 F. E. Reed, F. E. Reed Company, Worcester, Mass.
 A. W. Whitcomb, Charles E. Hildreth, Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass.
 H. L. Flather, Flather & Co., Inc., Nashua, N. H.
 Henry B. Binsse, Binsse Machine Company, Newark, N. J.
 Israel H. Johnson, Jr., I. H. Johnson, Jr., Company, Philadelphia, Pa.
 Murray Shipley, Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.
 Richard K. Le Blond, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio.
 George F. Stewart, Bradford Machine Tool Company, Cincinnati, Ohio.
 Albert E. Newton, Prentiss Bros. Company, Worcester, Mass.
 Oscar M. Flather, Mark Flather Planer Company, Nashua, N. H.
 E. Rivett, Rivett Lathe Mfg. Company, Boston, Mass.
 Fred A. Geier, Cincinnati Milling Machine Company, Cincinnati, Ohio.
 William A. Greaves, Greaves, Klusman & Co., Cincinnati, Ohio.
 H. C. Hoeflinghoff, Bickford Drill & Tool Company, Cincinnati, Ohio.
 H. W. Breckenridge, Colburn Machine Tool Company, Franklin, Pa.
 V. F. Hatch, Builders' Iron Foundry, Providence, R. I.
 G. O. Gridley, Windsor Machine Company, Windsor, Vt.
 C. J. Wetsel, Baush Machine & Tool Company, Springfield, Mass.
 F. L. Eberhardt, Gould & Eberhardt, Newark, N. J.
 George J. Burns, Chandler Planer Company, Ayer, Mass.
 E. P. Bullard, Jr., Bullard Machine Tool Company, Bridgeport, Conn.
 Clarence E. Whitney, Amos Whitney, Whitney Mfg. Company, Hartford, Conn.
 W. D. Woolson, Jones & Lamson Machine Company, Springfield, Vt.
 C. A. Hoefler, Hoefler Mfg. Company, Freeport, Ill.
 Among others present were:
 F. H. Brown, Brown & Zortmann, Pittsburgh, Pa.
 A. F. Chamberlain, Westinghouse Electric Mfg. Company, Cincinnati, Ohio.

Frank Baneroft, Manning, Maxwell & Moore, Philadelphia, Pa.
 Edwin S. Church, Philadelphia, Pa.
 Henry Prentiss, Prentiss Tool & Supply Company, New York.

PERSONAL.

Wm. H. Parrish, who has been connected with the National Tube Company at McKeesport, Pa., has been made night superintendent of the Brown Hoisting Machinery Company's plant at Cleveland, Ohio.

Theodore L. Condon, Chicago, has associated with him F. F. Sinks, heretofore his principal assistant, and the firm of Condon & Sinks will carry on at 1741 Monadnock Block, Chicago, the business of designing steel and reinforced concrete buildings and superintending their construction.

Elmer McCleary has been appointed chief chemist of the new Bessemer steel plant now being built by the Youngstown Sheet & Tube Company at Youngstown, Ohio. He was formerly at the Ohio works of the Carnegie Steel Company, Youngstown.

Richard C. Smith, New York sales agent of the National Wire Corporation, New Haven, Conn., has been appointed general sales agent and will divide his time between New York and New Haven.

C. E. Irwin, formerly with the Youngstown Steam Trap Company, Youngstown, Ohio, has severed that connection to engage with the Hukill-Hunter Company, Pittsburgh, dealer in mill supplies, and will cover the Pittsburgh district.

L. K. Hirsch, Philadelphia, president of the L. K. Hirsch Company, dealer in iron and steel, will shortly return from a three months' sojourn in Europe.

OBITUARY.

CHARLES L. STINSON, for many years a member of the firm of Stinson & Mansfield, foundrymen, Rutland, Vt., was killed by the cars at River Forest, a suburb of Chicago, April 26. He was 69 years old. The business of Stinson & Mansfield was merged into the Patch Mfg. Company, Rutland, a few years ago.

HORACE F. BROWN, mining engineer, died at Chicago, April 15, aged 66 years. For a number of years he was connected with various operations on the Pacific Coast, with headquarters at San Francisco. He had been engaged in the past year or two in the development of an ore reducing furnace, on which patents were granted recently. In its early stages this invention looked simply to the production of a clinker from fine ores or flue dust, and experiments with it were conducted at the Isabella Furnace at Sharpsburg, Pa. Mr. Brown designed the first really successful straight line ore roasting furnace. Another invention was a coal cutting machine which he sought to introduce in the Pennsylvania, Indiana and Illinois fields. His patent expired before the general use of coal mining machinery, but the continuous coal cutting machines now built followed the lines of his invention.

JAMES MCKAY, a well-known business man of Pittsburgh, died suddenly at his residence in that city April 29. He was born December 4, 1829, in Ireland, and came to the United States in 1850, stopping for a short time in Philadelphia and locating in Pittsburgh in 1851. He became actively engaged in business there, and when the discovery of oil in Pennsylvania began to attract attention he was one of the first to see the possibilities of the oil trade and continued in it very successfully for a long time. He was also largely identified with mining operations in the West, being interested in lucrative gold mines in Colorado. He was the founder of the James McKay Company, chain manufacturer, having a large plant at McKees Rocks, Pittsburgh, and was also one of the founders of the Redstone Coal, Coke & Oil Company. He was vice-president of the Duquesne National Bank, Pittsburgh, and was a large holder of real estate in the city and vicinity. He was a member of the Duquesne and Country clubs. He is survived by his widow, three sons and five daughters.

NEWS OF THE WORKS.

Iron and Steel.

The Kenton Iron & Steel Company commenced the erection of a rolling mill some time ago at Mason City, W. Va. Recently work on the construction of the plant was suspended on account of legal complications, but these have been arranged, and the plant is now being completed. It will be equipped with one 10 and 16 inch train of rolls and will have an annual capacity of about 15,000 tons of bar iron and bar steel.

The plant of the Carnegie Tube Company, at Carnegie, Pa., is offered for sale. The works, which were operated for a time in 1905 by the A. M. Byers Company under lease, are equipped for the manufacture of iron skelp and wrought iron pipe, and have an annual capacity of about 30,000 tons of skelp and 20,000 tons of pipe of the smaller sizes.

Spang, Chalfant & Co., operating the Etna Iron & Tube Works, Pittsburgh, have recently struck a large gas well near their plant. They were the first in the Pittsburgh district to use natural gas as a fuel for manufacturing purposes on a commercial basis.

The Shenango Iron & Steel Company, Lewis Building, Pittsburgh, expects to have its entire plant at Wheatland, Pa., in full operation not later than May 15. The puddling furnaces and muck bar mill have been running for some time, and the finishing departments, which include trains for the rolling of iron bars and iron skelp, will be started within two weeks. The products consist of muck bar, refined iron bars and skelp rolled from iron exclusively. The company acquired some time ago the plant of the Continental Iron Company, at Wheatland, and has made large additions and improvements to it and has very considerably increased the output.

President John P. Williams of the Bon Air Coal & Iron Company, Nashville, Tenn., on April 12 sent a letter to the shareholders, which is in part as follows: "Negotiations are pending for a sale of the company's properties for \$5,000,000, to be paid in cash on or before March 1, 1907, over and above the bonded debt. An option contract has been executed in accordance with which the proposed purchaser has put up \$100,000, which is to become the property of the company upon its compliance with the following conditions of the contract: 1. The company is to add to its properties and include in its conveyance 60,000 acres of land, more or less, adjoining its properties. 2. The company is to cause all or a majority of its outstanding stock to be deposited with the Fourth National Bank of Nashville, Tenn., duly endorsed for transfer, the bank to issue its negotiable receipts therefor. 3. The company, upon receiving the payment of \$5,000,000 in cash, including said \$100,000, is to convey to the purchaser, subject to its bond mortgages, the properties now owned and the 60,000 acres to be acquired."

The Burden Iron Company, Troy, N. Y., has awarded a contract for erection of a new rolling mill building, 100 x 378 feet, to the Hudson Valley Construction Company.

An option has been taken by the interests which recently acquired the Tennessee Coal, Iron & Railroad Company on the ore properties and blast furnace of the Alabama & Georgia Iron Company. The latter company operates the Cherokee Furnace, a charcoal stack at Cedartown, Ga. It draws its ore supply for this furnace from a mine at Grady, a short distance from the furnace. It also owns the extensive Frog Mountain deposit of brown ore, at Piedmont, Ga., which is probably the most extensive merchant brown ore mine in the South. It was particularly for the acquisition of the brown ore property that the option was taken by the Tennessee company interests.

The Detroit Furnace Company has been formed at Detroit, Mich., to take over the Wayne Furnace of Detroit, which has been operated heretofore as a charcoal furnace by the Wayne Iron Company. The furnace will be remodeled to use coke and will make malleable, car wheel and other pig iron. J. C. Clutts, who sold his interest in the Wellston Iron & Steel Company, Wellston, Ohio, about 18 months ago, will be president of the new company, and Porter McMillen, formerly of the Wellston Iron & Steel Company, will be superintendent. C. F. Fraser, formerly of the Wayne Iron Company, will be treasurer. Joseph H. Berry, who controls a number of charcoal furnaces in Michigan and Wisconsin, is also connected with the new company. The products of the company will be sold by Rogers, Brown & Co. It will go in blast about July 1.

The Huntington Rail Mfg. Company, Huntington, W. Va., is designing rolls to make special bars to be used in heavy concrete construction work. The bars will be rerolled from old rails, and will be similar to small I-beam shapes and twisted the entire length. In weight they will be the same as 1½ and 1½ inch square bars now in use, but will have about three times the surface. The plant will be ready for the new work in about six weeks.

The works in Frankford, Philadelphia, formerly operated by the Philadelphia Steel & Iron Company, which have been idle for some time, are for sale. The plant is equipped with one 20,000-pound special furnace for the manufacture of Atlas tool steel and castings. Atlas steel is said to have a tensile strength of from 50,000 to 60,000 pounds per square inch. The plant is

also equipped with one 2-pot crucible steel furnace, in which metal for nickel steel castings was formerly melted. Address William Porter, Land Title Building, Philadelphia.

General Machinery.

The Klotz Machine Company, Sandusky, Ohio, has just completed remodeling its foundry and erecting a three-story brick building, 60 x 120 feet, for machine and pattern shop. Added equipment consists of a 5-ton traveling crane, 36 x 36 inch by 8 foot open side planer, 48 inch by 10 foot lathe, shaper, drill press and other small tools. These improvements, in connection with equipment previously in use, enables the company to take care of a large amount of job work in addition to the regular line of axle handle machinery and wine makers' machinery.

The Republic Machine Works, Kansas City, Mo., has incorporated to succeed the Morgan Machine & Engineering Company, located at 1422 Walnut street. The incorporators are W. J. Morgan, Webster Archer and Henry Davis.

The Denver & Rio Grande Railroad intends to make some improvements at its shops at Burnham, Col.

The Springfield Machine Tool Company, Springfield, Ohio, reports an excellent foreign demand for its lathe, one house alone taking 20 monthly. The company is at present producing them in lots of 50 at a time.

The receivership of the Solid Steel Tool & Forge Company, whose plant is located at Brackenridge, Allegheny County, Pa., was terminated on May 1. We are advised that the company has paid off all its debts and that all the old officials have been re-elected. It has plenty of orders on its books and expects to operate its plant to full capacity for some time to come.

The Vulcan Foundry & Machine Company, House Building, Pittsburgh, works at New Castle, Pa., manufacturer of rolling mill special machinery and iron and steel castings, has recently secured some large contracts and is operating its works to full capacity.

Fire at the plant of the Vilter Mfg. Company, Milwaukee, builder of ice making and refrigerating machinery, engines and brewers' machinery, destroyed the major portion of its pipe working shops and also to some extent the blacksmith shops April 21. The loss will approximate \$25,000. The work of clearing away the debris was begun immediately and the company states that it will not be long delayed on the execution of its contracts, particularly as the works are being operated day and night. None of the working force has been made idle as a result of the fire. The company also has a Chicago office in the Monadnock Building.

Power Plant Equipment.

The Canadian Westinghouse Company, Limited, has been awarded a contract by the Montreal Street Railway Company for 20 quadruple equipments of 101-B railroad motors complete with controllers and details; a 1000-kw. 600-volt direct current engine type generator, for installation in the main power house, and three 500-kw. three-bearing motor generator sets, consisting of type C motors and 550-volt direct current generators. The Canadian Westinghouse Company are furnishing the T. Eaton Company, Limited, Toronto, a 300-kw. direct current 550-volt engine type generator, to be used as part of its present large power plant, which is considered one of the most up to date direct current plants in Canada, and is equipped throughout with Westinghouse apparatus.

The Augustine Rotary Engine Company has been incorporated at Buffalo, N. Y., to manufacture rotary engines of a new design. Capital stock is \$100,000 and directors are B. F. Augustine, J. W. Lamboir and A. C. Augustine, Buffalo.

The Harrisburg Foundry & Machine Works, Harrisburg, Pa., has received several orders for large electric generators, direct connected, for San Francisco buildings. The orders are rush orders, as they are to be placed in buildings which will be reconstructed since the fire.

The Falk Company, machinist and manufacturer of patented steam and electric railroad appliances, will erect a new power house at its plant in Milwaukee to cost \$20,000. The building will be 100 x 150 feet and is erected to replace the old one, which has become inadequate.

The Birmingham Boiler Works, Birmingham, Ala., has added a foundry equipment and is now installing machinery for drop and general forging business which when finished it expects will be one of the most complete plants of its kind in the South. This addition will enable the company to do the entire work in the building of blast furnaces, stand pipes, boilers and tanks. Superintendent of the forging department is W. E. Nichols.

The Crocker-Wheeler Company, Ampere, N. J., received the first message from its Pacific Coast representative, San Francisco, Cal., on April 21, stating that the company's stock was totally destroyed. The three or four 4000-kw. alternating generators installed in the plant of the California Gas & Electric Corporation were reported in good condition.

Foundries.

The Ross-Mehan Foundry Company, Chattanooga, Tenn., is adding two new melting furnaces having a capacity of 15 tons each and which are of the standard reverberatory type. To take care of its increased melting capacity the company has under

construction eight new 66-pot annealing ovens, which will augment the capacity 6000 tons per annum.

The Chicago Malleable Castings Company, West Pullman, Ill., is enlarging its core department, having provided room for 30 additional core makers. Its old core ovens have been replaced with new ones and other minor improvements made about the plant.

The National Sewing Machine Company, Belvidere, Ill., is enlarging its plant by the erection of a two-story building 40 x 60 feet, which will be utilized as the core department.

The Eclipse Gas Stove Company, Rockford, Ill., will build an addition, 85 x 100 feet, to its foundry. Employment will be given to 25 additional men.

The Union Iron Works, Spokane, Wash., has let contract for a new foundry building which will cost about \$30,000. A crane has been purchased from the Niles-Bement-Pond Company and the company will build the cupolas itself. The balance of the necessary equipment has not yet been purchased.

The Burrill Foundry Company, Brantford, Ont., is having plans prepared for a new foundry, 50 x 110 feet, as well as other buildings. Construction will shortly be commenced, and it is expected to have these additions completed by the middle of June.

On application of the president the United Trust Company, Indianapolis, Ind., has been appointed receiver for the Shirley Radiator & Foundry Company of that city. The management of the company will not be changed in any way, and the receiver will continue to operate the plant in the same way that it operated the Kelly Axe Company and is to-day operating the McElwaine Company. There will be no disturbance of the business by reason of the appointment of the receiver.

The Worcester Steel Foundry Company, Worcester, Mass., at its annual meeting held in March elected the following officers: William Pestell, president and general manager; William E. Oakley, vice-president; V. H. Moody, treasurer. The directors have authorized the erection of an addition to the foundry at Millbury, Mass., to be 40 x 65 feet; also an office building, and it is expected to have the additions ready for occupancy in about a month, which, it is stated, will increase the capacity of the works about 50 per cent., as additional furnaces and drying ovens for molds will be installed. On completion of these improvements the general offices of the company will be moved from Worcester to Millbury, Mass.

The Malleable Iron Fittings Company, Branford, Conn., has commenced the installation of two modified 3-ton Tropenas converters, which it expects to have ready for operation early in June. A specialty will be made of castings for water, steam and gas fittings. The company now makes open hearth steel and malleable iron castings.

The Buffalo Crucible Casting Company, Buffalo, N. Y., is erecting one 36-pot crucible steel melting furnace, which it expects to have completed and ready for operation about May 1. A specialty will be made of steel castings, for which the company will have an annual capacity of 4,000 tons. Producer gas will be used for fuel. The officers are: E. G. Rippel, president; J. L. Osgood, vice-president; A. W. Thorn, treasurer; F. L. Slee, secretary.

Fires.

A part of the plant of the Etna Foundry & Machine Company, Springfield, Ill., was destroyed by fire April 26. The loss amounts to about \$10,000.

A fire on April 27 did \$20,000 damage to the works of the Harlan & Hollingsworth Company, Wilmington, Del.

The coal tipple and machinery of the Ohio & Pennsylvania Coal Company at Salineville, Ohio, were destroyed by fire April 25.

The Dominion Gold Mining & Reduction Company's works at Kenora, Ont., were destroyed by fire April 26. The loss is placed at \$20,000.

The Bay Way Refining Company's plant at Elizabethport, N. J., was burned April 29, the loss amounting to about \$75,000.

Hardware.

The Quincy Enameling & Foundry Company, Quincy, Ill., has been incorporated, with a capital stock of \$4,000, by John M. Winters, J. F. Teibuescher, L. H. Menne and W. H. Govert. The company will for the present confine its operations to producing enameled goods, both light and heavy.

Officers of the Andrews Pressed Metal Mfg. Company, Elgin, Ill., are in receipt of several propositions from other cities which desire to secure the company's plant, but if satisfactory arrangements can be made it is the intention of the company to remain in Elgin. A building will be erected, 50 x 100 feet, for the production of reservoir lawn vases, lawn tubs, flower pots, pressed metalware and general job work. The building will be equipped with a line of Bliss presses.

W. C. Heller & Co., manufacturers of steel shelf boxes, &c., formerly of Montclair, N. J., have moved their plant to Montpelier, Ohio, where they have a new and modern factory, equipped throughout with up to date machinery. The firm reports that its business has grown so fast that the old plant was unequal to the orders offered, but with the increased fa-

cilities it will be possible to carry a larger stock and make prompter shipments than heretofore.

The Steward & Romaine Mfg. Company, Philadelphia, Pa., manufacturer of expansion and toggle bolts, has acquired the entire building at 124 North Sixth street, in which it had heretofore occupied several floors. The building, which is five stories high, will give it sufficient space to more than double its present capacity. The demand for the company's line of expansion bolts has been very large, particularly for export, for which account heavy shipments have recently been made.

The Brook Novelty Works, Brook, Ind., which was established in 1900 for the manufacture of Hardware specialties and novelties, will shortly incorporate for \$20,000. A new factory will be erected, 40 x 80 feet, and two stories in height, and equipment will be needed in the way of planers, resaws, multiple saws, &c. Some new articles have recently been added to the line of manufacture, including a combination bread knife, meat mincer and pancake turner, and a washboard.

The Meyer Foundry & Mfg. Company, South Bend, Ind., has been incorporated, with a capital stock of \$30,000. The company recently bought the plant of the Anderson Plow Works, and while it will continue to do a plow business, will devote its attention principally to the manufacture of Hardware specialties and conducting a general foundry and machine shop. The plant is a comparatively new one, having been completed in the fall of 1903. The main building is of brick construction, 420 feet long and 80 feet wide. The engine room, grinding room and paint shop are in separate buildings. The incorporators of the new company are Henry J. Meyer, Edward DeKezel and Robert B. McInerney.

The International Silver Company, Meriden, Conn., has acquired the business of the Rowley Silver Company, Philadelphia, manufacturer of high grade nickel-silver hotel ware. The machinery and equipment generally will be installed as a part of the nickel-silver department of the International Company's factory E, Meriden. The Rowley Company has employed about 100 hands. The International Silver Company is making extensive repairs to the building recently occupied by the Bergen Cut Glass Company, Meriden, which the owner will now use for the accommodation of its sterling department.

Lewis M. Mann & Son, West Paris, Me., manufacturers of clothes pins and pail bail goods, are to rebuild their factory, recently destroyed by fire. The new building will be on a considerably larger scale than the old, which was hardly adequate for the business.

Miscellaneous.

The Hartford Automobile Parts Company, Hartford, Conn., has been incorporated in Connecticut to manufacture and deal in automobile parts. The officers are: President and treasurer, E. A. Bardol, Hartford; secretary, A. J. Broughel, Hartford; vice-president and manager, F. H. Bogart, New Britain. The company will open an office at 438 Asylum street, Hartford, where sufficient space has been secured, together with power, to accommodate present needs. It is the intention of the company to confine its efforts during its first year to assembling parts, contracting the manufacturing among the jobbing companies of Hartford and vicinity. The purpose is to produce high-grade parts, in the belief that there are many builders of automobiles now producing finished cars who would prefer, if it were possible, to buy parts from outside makers. The first product will be a new type of universal or Cardan joint.

Plans are under way for the establishment of a sugar refinery at Baltimore, Md., with a capacity of about 500 barrels a day. The site for the new refinery has not yet been selected, although several are under consideration. Among those said to be interested are George R. Brown of Philadelphia; H. Carroll Brown, New York; Francis K. Carey, Thomas J. Hayward, C. Morton Stewart, Jr., Charles A. Webb and John H. Windfelder of Baltimore.

The Speakman Supply & Pipe Company, Wilmington, Del., has purchased the property of the Wilmington Dental Mfg. Company, where it expects to move its entire manufacturing department in about three months. In addition to the buildings now on the property the company will build other structures, one of which will be 60 x 120 feet.

C. J. Donovan is to establish a brass foundry at Haverhill, Mass. He was formerly for 21 years with the B. F. Sturtevant Company, Readville, Mass., in the company's foundry, and made a specialty of Babbitt metal, which he will have as a feature of his own business.

A. B. Curtis, Worcester, Mass., has retired from the presidency of the Reed & Curtis Mfg. Company and the Worcester Lawn Mower Company, and will establish a shop at 10 Loudon street, Worcester, for the manufacture of the oil separator which has been made by the Reed & Curtis Company for a number of years. He will also manufacture the envelope opener manufactured by the Reed & Curtis Company, and a new pencil sharpener.

The Janke & Weise Mfg. Company, cabinetmaker, Wausau, Wis., is enlarging its plant by the erection of a two-story factory building 42 x 126 feet, two-story warehouse and office building 42 x 84 feet and a boiler house 20 x 30 feet. The following machinery will be added: A 48-inch sander, 7-inch

molder, 30-inch planer, self feed rip saw, cross cut saw, rip saw, jig saw, band saw, shaper, jointer, lathes and motors for individual drive.

The National Tube Company is preparing to erect a large pipe galvanizing plant in connection with its works at Lorain, Ohio. The galvanizing of pipes will be confined to the smaller sizes for merchant purposes.

The Electrical Products Company has commenced work on a large factory building at Ravenna, Ohio, where it will manufacture carbons and electrical specialties.

The Conley Frog & Switch Mfg. Company, Arcola, Ill., has incorporated with a capital stock of \$200,000 to manufacture frogs and switches. The incorporators are John E. Conley, Harry C. Flickinger and Michael F. McCafferty. A site for a plant is yet to be selected.

The United States Brick Company, Reading, Pa., expects in the near future to erect a large brick plant at Hoboken, N. J., where the company has purchased about 700 acres of land.

The recent fire in the toy and novelty plant of Austin & Craw, South Norwalk, Conn., completely gutted the building, but many of the machines were not damaged beyond repair. It is probable that the plant will be rebuilt in the near future, but the price of building material is so high at present that the company will defer building for a time.

The Pressed Steel Car Company, Pittsburgh, is operating its steel car plant at Montreal, Can., to full capacity, and is said to have the output practically sold up for the balance of this year.

The Milwaukee-Western Fuel Company, Milwaukee, Wis., will erect new coal storage docks, involving an expenditure of \$500,000. Contract for the equipment, machinery and steel bridges has been let to Heyl & Patterson, Pittsburgh, and the C. H. Starke Dredge & Dock Company will do the docking. The foundations will be built by the Milwaukee-Western Fuel Company, under the supervision of its chief engineer. The equipment to be installed consists of three modern electric unloading and storage bridges, each having a capacity of 500 tons an hour.

The Sprague Electric Company, New York, reports a constantly growing demand for its flexible conduits and armored cables, manufactured under the Greenfield patents. Last month was a banner month in total sales. The Sprague Company's conduits are said to be the first ever placed upon the market, and to-day they represent the latest advances in the art of modern installation of electric wiring.

The General Mfg. Company has been incorporated at Elkhart, Ind., with \$50,000 capital stock, by Dennis E. McCarthy, Chas. G. Stevens and Albert D. Dorman. It will manufacture printing machinery, automatic bag machinery, &c.

The ship yards on the Niagara River at Bridgeburg, Ont., opposite Buffalo, are being rushed to completion in order that the owners, the Canadian Shipbuilding Company, may get to work immediately on the construction of two of the largest steamers ever built in Canada. One is a 10,000-ton steel freight steamer for the Chicago & St. Lawrence Transportation Company, and the other is a new palace steamer for the Canadian Pacific Railway, for use on the upper lakes and presumably to go on the new Victoria Harbor route. The Bridgeburg yards will be completely equipped with modern machinery and appliances.

The Consolidated Stone Company, Bedford, Ind., has completed plans for one of the largest stone mills in the Bedford district. The Indiana stone industry is flourishing. One Bedford firm, Bradley & Sons, has contracts that will keep its yards at capacity for five to seven years, the product to go largely to New York for the new railway station, the addition to the Trinity Building and other large structures.

The Middletown Car Works has commenced the erection of a large addition at its plant at Middletown, Pa. The building will cost \$100,000 and will be constructed entirely of steel. It will be 75 x 250 feet.

Officials of several of the subsidiary companies of the United States Steel Corporation left Chicago April 26 for San Francisco to aid in re-establishing branch offices of these companies and in the management attendant upon their resumption. The party was in charge of Frank Baackes, general sales agent of the American Steel & Wire Company; John A. Neale, assistant manager of sales and structural engineer, Carnegie Steel Company, Pittsburgh; F. T. Bentley, traffic manager, Illinois Steel Company; R. S. White, credit manager, American Steel & Wire Company; John Duncan, general sales agent, Western Tube Company, Kewanee, Ill., and B. B. Ayres of the American Steel & Wire Company.

The Poughkeepsie, N. Y., Board of Trade is interested in locating in that city a plant for the manufacture of malleable castings and cites the local consumption of such castings and the facilities for shipments as advantages. H. T. Hoag is secretary.

The Condition of the Anthracite Blast Furnaces.

The inquiry was addressed by *The Iron Age* to blast furnace companies in the districts in which anthracite coal is used, whether the suspension of work at anthracite mines had interfered with operations at these furnaces. In general it appears that there has not been any serious curtailment of output. The anthracite furnaces are for the most part of small capacity, and as was shown in the strike of 1902, even a considerable percentage of reduction in their output does not cut a large figure in the total pig iron production of the country.

In the Schuylkill Valley, Topton furnace of the Empire Steel & Iron Company is running fairly well on three-fourths coke, and the anthracite coal in stock there will last through the month of May. One of the Henry Clay stacks of this company, at Reading, has been banked for the past two weeks. The other furnace at Reading can run for a week or more and operations will then be suspended until regular shipments of coal can be secured. At Birdsboro the larger furnace of the E. & G. Brooke Iron Company has been put on all coke. The smaller furnace is still running, but when the stock of anthracite coal now on hand is exhausted will have to blow out, as this furnace cannot be run exclusively on coke. The Reading Iron Company can substitute coke for anthracite at its Keystone furnace, and therefore expects no difficulty. Temple furnace, at Temple, Berks County, has not suffered any interruption thus far and probably will not, as it can use all coke. While the Warwick furnaces at Pottstown and the Swede furnaces at Swedeland ordinarily use a small percentage of anthracite coal, they are able to use all coke and therefore can go on without interruption.

In the Lehigh Valley some difficulty has been experienced by furnaces depending largely on anthracite, and which even on a pinch cannot run on coke entirely. The two furnaces of the Allentown Rolling Mills have been out all the year, so that their production will not be missed in any event. The Carbon furnace at Parryville will have no trouble if a sufficient supply of coke can be secured, which is entirely probable. Macungie furnace of the Empire Steel & Iron Company needed relining and was blown out as soon as the stock of anthracite on hand was used up. Repairs are now well under way. Three of the four Crane stacks of this company at Catasauqua depend on at least 40 per cent. of anthracite coal. One of the three was blown out last week, having ended a successful campaign of over three years. It will now be relined. The other two furnaces have sufficient coal, if used in reduced quantities, to last to the end of May.

In the Upper and Lower Susquehanna valleys the effect of the anthracite suspension is very little felt. The Pennsylvania Steel Company has some difficulty in getting sufficient buckwheat coal for its ore roasters at Lebanon. At Steelton the receipts of hard coal have been shortened, but there has been no interference with furnace operations. The Lebanon Valley Furnace Company has not been much inconvenienced, except that it is receiving broken coal instead of steamboat and rice instead of buckwheat. The Robesonia furnace has a three months' supply of anthracite, using one-quarter coal in its fuel mixture. It can use all coke. There has been no interference with the operations of the Central Iron & Steel Company.

Of the New Jersey furnaces, the Wharton group and Andover do not use anthracite. Oxford furnace of the Empire Steel & Iron Company was banked two weeks ago for want of coal, but has been started up in the past week with the expectation of running on all coke. Pequest furnace has not been inconvenienced by the suspension of work. The furnace of the Hudson Iron Company is still out of blast.

In *The Iron Age* of March 22 a statement was presented showing the effect of the anthracite strike of 1902 on the production of pig iron in the four districts referred to above. In the three months preceding the strike and the two months following, the average monthly product was 157,311 tons, while in the five months of the strike the average monthly product was 135,475 tons. The curtailment was thus about 22,000 tons a month. In case of another anthracite strike the reduction of output would be very considerably less than in 1902.

The Iron and Metal Trades

So far as can be learned, only a few orders of some size footing up to 10,000 tons of Structural Steel have been placed for San Francisco delivery. In order to convey some definite impression what the Steel requirements after a great fire amount to we cited the fact last week that the orders from Baltimore to rebuild the burned district there to date amounted to 30,000 tons. This seems to have been interpreted in some quarters as an estimate of what San Francisco might use. Such an estimate, of course, would be altogether too low. The point is that even if it ran up to ten times the Baltimore tonnage during the next five years, which is considerably above conservative expert estimates, the structural mills of this country could readily meet the demand without straining present resources, and without creating any boom in the Steel industry. The public has an altogether exaggerated idea of the Steel requirements of the building industry. They strike the layman and are impressive, but the tonnage is not greater than that needed by the Wire industry, for example.

The Steel Rail mills have booked orders aggregating 200,000 tons for 1907 delivery from three Western roads, and there are negotiations pending which will call for 300,000 tons more and which will probably be closed within the next ten days.

With the exception of the market for Bessemer and Basic Pig in the Central West the Pig Iron markets are showing signs of irregularity and of some weakness. The United States Steel Corporation has taken all the May Bessemer Pig in the Pittsburgh district, the quantity being 14,000 tons, or considerably less than was believed to be available. In the Chicago district 10,000 tons of Basic Pig has been purchased for the third quarter by an independent Steel mill, and 6000 tons more is under negotiation for another works. In the East a leading company has bought 18,000 tons for Philadelphia delivery, on which lower prices have been made than have prevailed lately. Eastern Pennsylvania Plate mills have contracted for 10,000 to 15,000 tons, and some other smaller blocks have been placed.

Some heavy sales of Malleable Bessemer Pig have been made in Chicago and elsewhere, the tonnage in the former district footing up to 15,000 tons. There is considerably more pending throughout the Central West and in the East, and in some instances concessions have been made. There is an inquiry in the Chicago market for 75,000 tons of Charcoal and Malleable Iron for railroad castings, the price to be determined by the market at time of delivery.

The strikes in the foundries in the Boston and Chicago districts may affect the current consumption of Foundry Iron, in which some irregularity has developed lately, particularly in those sections which the lake furnaces can readily reach.

The Plate trade has been rather quiet lately and the mills, with their enormous productive power, are now able to make prompt deliveries. It is expected, however, that the Pennsylvania Railroad will soon place orders for 20,000 cars, which would call for 200,000 tons of Plates and Shapes. There is an inquiry in the market, too, for 17,000 tons of narrow Plates for Pipe.

Some large contracts are under negotiation for Line Pipe. One calls for 116 miles for the Eastern Oil Company and 60 miles for the Ohio Fuel Supply Company.

The irregularity which has existed for some time in the market for Boiler Tubes has culminated in an open reduction of four points.

The independent Sheet mills are urging an advance of \$2 on Sheets to compensate for the higher cost of Steel. The market has stiffened by the withdrawal of concessions from the official prices.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Mar. 2, 1906.	Apr. 25, 1906.	Apr. 4, 1906.	Mar. 1, 1905.
PIG IRON , Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	\$18.50	\$18.50	\$18.25	\$17.50
Foundry No. 2 Southern, Cincinnati	16.75	16.75	16.50	16.25
Foundry No. 2, Local, Chicago ..	18.75	18.75	18.75	17.50
Bessemer, Pittsburgh	18.10	18.10	18.20	16.35
Gray Forge, Pittsburgh	16.60	16.60	16.60	16.00
Lake Superior Charcoal, Chicago ..	19.25	19.25	19.50	18.50
BILLETS, RAILS, &c. , per Gross Ton:				
Bessemer Billets, Pittsburgh ..	27.00	27.00	27.00	24.00
Forging Billets, Pittsburgh	32.00	32.00	32.00	28.00
Open Hearth Billets, Phila.	29.00	29.00	29.00	28.00
Wire Rods, Pittsburgh	34.50	34.50	34.00	31.00
Steel Rails, Heavy, Eastern Mill ..	28.00	28.00	28.00	28.00
OLD MATERIAL , per Gross Ton:				
O. Steel Rails, Chicago	14.00	14.00	13.50	14.00
O. Steel Rails, Philadelphia	17.25	17.25	17.00	18.00
O. Iron Rails, Chicago	21.25	21.25	20.50	19.50
O. Iron Rails, Philadelphia	21.50	21.50	21.50	23.00
O. Car Wheels, Chicago	19.00	19.00	18.00	15.75
O. Car Wheels, Philadelphia	16.75	16.75	16.75	16.00
Heavy Steel Scrap, Pittsburgh ..	15.00	15.00	14.50	15.50
Heavy Steel Scrap, Chicago	13.50	13.50	13.50	14.00
FINISHED IRON AND STEEL , per Pound:				
Refined Iron Bars, Philadelphia ..	1.63½	1.63½	1.73½	1.73½
Common Iron Bars, Chicago	1.66½	1.66½	1.71½	1.60
Common Iron Bars, Pittsburgh ..	1.50	1.50	1.60	1.65
Steel Bars, Tidewater, New York ..	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York ..	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Beams, Pittsburgh	1.70	1.70	1.70	1.60
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Angles, Pittsburgh	1.70	1.70	1.70	1.60
Skelp, Grooved Steel, Pittsburgh ..	1.57½	1.57½	1.57½	1.60
Skelp, Sheared Steel, Pittsburgh ..	1.60	1.60	1.60	1.65
SHEETS, NAILS AND WIRE , per Pound:				
Sheets, No. 27, Pittsburgh	2.25	2.25	2.25	2.20
Wire Nails, Pittsburgh	1.85	1.85	1.85	1.80
Cut Nails, Pittsburgh	1.80	1.80	1.80	1.85
Barb Wire, Galv., Pittsburgh	2.30	2.30	2.30	2.25
METALS , per Pound:				
Copper, New York	18.62½	18.62½	18.62½	15.22
Spelter, St. Louis	5.95	6.05	6.00	6.10
Lead, New York	5.60	5.50	5.35	4.45
Lead, St. Louis	5.60	5.40	5.25	4.35
Tin, New York	40.00	39.80	38.25	28.60
Antimony, Hallett, New York	22.00	21.00	18.00	7.87½
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	\$3.79	\$3.79	\$3.69	\$3.74

Chicago.

FISHER BUILDING, May 2, 1906.—(By Telegraph.)

The heavy buying of Pig Iron by foundry interests to cover future requirements has been the feature of the week. The aggregate placed will easily total 35,000 tons, of which Malleable interests purchased 15,000, Steel foundries 5000, Gray Iron foundries 5000, while 10,000 tons of Basic were taken by one independent Steel producer. Another Western Malleable interest is in the market for 75,000 tons of Charcoal and Malleable Bessemer for equal deliveries during the next five years, to cover a railroad contract for castings during the same period. Price adjustments are to be made monthly, based on ruling market quotations. A large number of the Malleable foundries have not yet contracted for the last half, although a large tonnage of castings has been booked for this delivery, and it is estimated that at least 15,000 tons will be placed before the end of the week. The inquiry of one Steel interest for 10,000 to 20,000 tons of Basic has shrunk to 6000 tons for third quarter shipment on account of the high prices that are prevailing in all producing districts. In finished lines Boiler Tubes and Sheared Plates are the only points of weakness. A decline of 4 points, equal to \$8 a ton, on Boiler Tubes is a culmination of the irregularity that has existed for some time. While all of the independent manufacturers have made this reduction, it has not been officially made by the leading interest. On wide Plates all of the mills both East and West are in a position to make prompt deliveries, and almost without exception all of the large tonnages booked last fall have already been rolled. The Sheet market is unusually strong and prices are firmer, concessions no longer being possible on account of the high cost of Sheet Bars. Implement interests continue to contract freely for Agricultural Shapes, but Steel Bar con-

sumers outside of the implement trade are not inclined to purchase for future wants on the basis of 1.50c., Pittsburgh, in view of the concession of \$2 a ton made to the implement manufacturers, and are limiting their purchases to current needs. A majority of the 160 foundries in this district were shut down to-day on account of the refusal of molders' demands, while shipping on the Great Lakes has come to a standstill on account of a strike of the vessel mates. A protracted interruption of lake traffic will seriously affect the mills dependent upon a Coal supply from this source and may lead to a speedy resumption of the Illinois mines. Ore shipments will also be curtailed, although present stocks are sufficient to meet furnacemen's demands for a period of 60 days at least.

Pig Iron.—The heavy inquiry for all grades of Pig Iron has at last culminated in an extensive buying movement and additional large purchases are under consideration. The Inland Steel Company has purchased 10,000 tons of Basic for third quarter delivery, and another Steel interest is in the market for 6000 tons. The purchases of Malleable foundries were on the basis of \$18.75 to \$19 for local Irons, while Ohio furnaces are quoting \$18.55 to \$18.60. These quotations represent an advance of 25c. over those prevailing a week ago, and Basic is also firmer. At Moline, Ill., an implement manufacturer contracted for 3000 tons of No. 2 Foundry, and a local melter has inquired for 2500 tons of Nos. 2 and 3 and High Silicon for early delivery. The International Harvester Company is expected in the market daily, quotations being asked for tentatively without a formal inquiry. Several Southern interests continue to shade \$14, Birmingham, on No. 2, although this is firmly maintained by the leading producers. Prevailing quotations, f.o.b. Chicago, are as follows:

Lake Superior Charcoal.....	\$19.25 to \$20.00
Northern Coke Foundry, No. 1.....	19.25 to 19.50
Northern Coke Foundry, No. 2.....	18.75 to 19.00
Northern Coke Foundry, No. 3.....	18.25 to 18.50
Northern Scotch, No. 1.....	19.75 to 20.00
Ohio Strong Softeners, No. 1.....	19.30 to 19.55
Ohio Strong Softeners, No. 2.....	18.80 to 19.05
Southern Coke, No. 1.....	18.25 to 18.40
Southern Coke, No. 2.....	17.65 to 17.90
Southern Coke, No. 3.....	17.15 to 17.40
Southern Coke, No. 4.....	16.65 to 16.90
Southern Coke, No. 1 Soft.....	18.15 to 18.40
Southern Coke, No. 2 Soft.....	17.65 to 17.90
Southern Gray Forge and Mottled.....	16.15 to 16.40
Malleable Bessemer.....	18.55 to 19.00
Standard Bessemer.....	19.30 to 19.55
Jackson Co. and Kentucky Silvery, 6 %.....	20.30 to 20.80
Jackson Co. and Kentucky Silvery, 8 %.....	21.30 to 21.80
Jackson Co. and Kentucky Silvery, 10 %.....	23.30 to 23.80

Metals.—The shortage of Tin is still plainly shown in advancing prices, quotations being up 1½c. The demand for Copper is active and consumers are covering for some time into the future. Prices are advanced about ¼c. We quote: Casting Copper, 18½c. to 18¾c.; Lake, 18¾c. to 19c., in car lots; small lots, ¼c. to ¾c. higher; Pig Tin, car lots, 41½c. to 42c.; small lots, 42c. to 42½c.; Spelter, prompt delivery, 6.20c. to 6.35c., for car lots; Lead, Desilverized, 5.80c. to 6.05c., for 50-ton lots; Corroding, 6.35c. to 6.60c., for 50-ton lots; on car lots, 2¼c. per 100 lbs. higher; Cookson's Antimony, 23c. to 23½c., and other grades, ½c. less; Sheet Zinc is \$7.75 list, f.o.b. Lassel, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 16c.; Heavy Copper, 15½c.; Copper Bottoms, 15c.; Copper Clips, 15½c.; Red Brass, 15½c.; Red Brass Borings, 13½c.; Yellow Brass, Heavy, 12c.; Yellow Brass Borings, 10c.; Light Brass, 8½c.; Lead Pipe, 4½c.; Tea Lead, 4½c.; Zinc, 4½c.; Pewter, No. 1, 24c.; Tin Foil, 30c.; Block Tin Pipe, 27½c.

(By Mail.)

Billets and Rods.—The Inland Steel Company this week placed its fifth 50-ton Open Hearth furnace in operation. Another furnace of the same size is to be added, which when completed will give this company a daily output of 600 tons of Steel. Forging Billets are offered more freely than in the past and on small lots mills continue to quote \$34 to \$35. Bessemer Rods are easier and independent mills are quoting \$35, f.o.b. Chicago, as compared with \$36 asked by the leading producer for both Bessemer and Open Hearth grades.

Rails and Track Material.—None of the large Western roads have yet placed contracts for Standard Section Rails for next year's delivery, although estimates are being prepared by several and the allotments will be made to the different mills very shortly. Electric roads purchased approximately 1200 tons during the week, and one Western railroad is in the market for 4000 tons of Standard Section Rails for this year's delivery, but as yet the contract has not been placed. Light Rail demand continues good at unchanged prices. We quote as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 2.15c. to 2.25c.; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 15c. to 20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$27 to \$28; 25-lb., \$29; 20-lb., \$29 to \$30; 16-lb., \$30 to \$31; 12-lb., \$31 to \$32, and lighter sections down to 8-lb., \$38 to \$40, f.o.b. mill. Standard Sections are unchanged at \$28, f.o.b. mill, full freight to destination.

Structural Material.—No large contracts for new work were closed during the past week in the West, although the American Bridge Company secured several small jobs, including 800 tons for the Peavey elevator, Duluth, and 200 tons to be used in the erection of an office building at Bellingham, Wash. The Lake Erie & Western Railroad placed contracts for 1200 tons of bridge work, and the Lake Shore & Michigan Southern also contracted for two small bridges. One Western railroad has issued specifications for a new bridge that will require 4000 tons of Steel, and other work that is being figured on includes 800 tons for the new post office at Los Angeles, Cal.; new erecting shop for the Illinois Central Railroad at Burnside; refrigerating plant for the Schlitz Brewing Company, Milwaukee. Quotations are unchanged, as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.86½c.; Angles, 3 to 6 inches, ¼-inch and heavier, 1.86½c.; Angles, larger than 6 inches on one or both legs, 1.96½c.; Beams, larger than 15 inches, 1.96½c.; Zees, 3 inches and over, 1.86½c.; Tees, 3 inches and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending or other shop work.

Plates.—The demand for Plates continues very light and there has been a falling off in specifications during the past ten days. All of the mills both East and West are in position to make prompt deliveries and are competing keenly for small tonnages that are being offered from time to time. While the tonnage that is going into Steel cars and lake boats is unusually heavy, nevertheless the Plate producing capacity is so much greater than consumption that there is not sufficient business to keep the mills in operation constantly. Quotations continue to be firmly maintained, however, as follows: Tank quality, ¼-inch and heavier, wider than 6¼ and up to 100 inches wide, inclusive, car lots, Chicago, 1.76½c.; 3-16-inch, 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 inches, 1.86½c., base, for ¼-inch and heavier, with the same advances for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-inch and heavier, up to 72 inches wide, 2c. to 2.10c.; from 72 to 96 inches wide, 2.10c. to 2.20c.; 3-16-inch up to 60 inches wide, 2.10c. to 2.20c.; 72 inches wide, 2.35c. to 2.45c.; No. 8, up to 60 inches wide, 2.15c. to 2.25c.; Flange and Head quality, 25c. extra.

Sheets.—Some of the independent mills are strongly in favor of an advance of \$2 a ton on both Black and Galvanized Sheets, but the largest interest has not seen fit to make an advance in ruling quotations, and no higher prices than those named below are being secured. A radical advance on Sheet Bars has made present Sheet prices unprofitable to the outside manufacturer, and higher rates must be secured on the finished product in order to show a profit. The demand continues exceptionally good. We quote as follows: Blue Annealed, Nos. 9 and 10, 1.86½c. to 1.91½c.; Nos. 16 and 17, 2.06½c. to 2.11½c.; Box Annealed, Nos. 18 to 20, 2.26½c. to 2.31½c.; No. 27, 2.46½c. to 2.51½c.; No. 28, 2.56½c. to 2.61½c.; Galvanized Sheets, Nos. 10 to 14, 2.61½c.; Nos. 17 to 21, 2.86½c.; Nos. 22 to 24, 3.01½c.; Nos. 25 and 26, 3.21½c.; No. 27, 3.41½c.; No. 28, 3.61½c.; No. 30, 4.11½c. Sheets from store: Blue Annealed, Nos. 10 and 11, 2.10c. to 2.20c.; Nos. 12 and 13, 2.15c. to 2.25c.; Nos. 14 and 15, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c. Box Annealed: Nos. 18 to 20, 2.50c. to 2.55c.; Nos. 22 to 24, 2.55c. to 2.60c.; No. 26, 2.60c. to 2.65c.; No. 27, 2.65c. to 2.70c.; No. 28, 2.75c. to 2.80c.; No. 30, 3.15c. to 3.20c. Galvanized from store: Nos. 10 to 20, 3c. to 3.05c.; Nos. 22 to 24, 3.15c. to 3.20c.; No. 26, 3.35c. to 3.40c.; No. 27, 3.55c. to 3.60c.; No. 28, 3.75c. to 3.80c.; No. 30, 4.95c. to 5c.

Bars.—Little new business has been placed with the Steel Bar mills, and it is doubtful if any considerable tonnage will be purchased by large consumers, unless the same concession is made them as was granted the implement trade. Several large contracts are being held up for this reason, but it is certain that the mills will not again open their books and take on new tonnage on a 1.40c. basis. The demand for Iron Bars is heavy, and round tonnages continue to be placed with the mills on the basis of 1.50c., Pittsburgh. Quotations are unchanged, as follows: Iron Bars, 1.66½c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.06½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c.; Steel Bars, 1.85c., and as high as 2c. is asked on certain scarce sizes; Steel Bands, 1.85c. to 1.90c., half extras; Soft Steel Hoops, 2.30c. to 2.40c., full extras.

Merchant Pipe.—There is little change in the situation, and the new tonnage that is going to the mills is comparatively light. On the other hand, jobbers and consumers are specifying freely, indicating a heavy consumption. Quotations continue low and unchanged on the basis of 81 per cent. off the list, Pittsburgh, although official discounts on car lots, Chicago, remain as follows: Black Steel Pipe, 78.35 per cent. on the base sizes, ¾ to 6 inches, and Galvanized, 68.35 per cent. Iron Pipe is quoted from 1½ to 2 points higher. From store in small lots Chicago jobbers are

quoting 76½ to 77 per cent. on Black Steel Pipe, ¾ to 6 inches.

Boiler Tubes.—On April 24 a decline of four points was announced on both Steel and Charcoal Iron Boiler Tubes, effective immediately. This reduction in price has been made by all of the independent manufacturers, although no official list has been issued by the largest producer covering this decline. The Boiler Tube market has been irregular for some time and consumption has been light. No change has as yet been made in the store prices by the large Western distributors, nor has any change been made in prevailing mill quotations on Seamless Tubes. Discounts on base sizes, 2¼ to 5 inches, in car lots are as follows: Steel Tubes, 68.35; Iron, 55.35. Seamless, 50.35; 2½-inch and smaller and lengths over 18 feet, and 2½-inch and lengths over 22 feet, 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1½ inches.....	40	35	42½
1½ to 2¼ inches.....	50	35	35
2¼ inches.....	52½	35	30
2½ to 5 inches.....	60	47½	42½
6 inches and larger.....	50	35	..

Merchant Steel.—A round tonnage of Harrow Disks, Shafting and Smooth Finished Machinery Steel for delivery during the ensuing 12 months has been placed by implement makers within the past week, although the total quantity was not as large as that placed during the week preceding. Quotations are firmly maintained on the following basis: Planished or Smooth Finished Tire Steel, 1.86½¢; Iron Finish up to 1½ x ½ inch, 1.81½¢; Iron Finish, 1½ x ½ inch and larger, 1.66½¢, base; Channels for solid rubber tires, ¾ to 1 inch, 2.16½¢, and 1½ inch and larger, 2.06½¢; Smooth Finished Machinery Steel, 1.91½¢; Flat Sleigh Shoe, 1.71½¢; Concave and Convex Sleigh Shoe, 1.96½¢; Cutter Shoe, 2.35¢; Toe Calk Steel, 2.21½¢; Railway Spring, 1.86½¢; Crucible Tool Steel, 6½¢ to 8¢, and still higher prices are asked on special grades. Shafting, 50 per cent. off on car lots and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—The Western municipalities are not buying freely at present, and the requirements that are being figured upon by the Pipe producers are limited almost entirely to small lots. On May 15 the city of New Orleans will close for 15,000 tons, as previously reported in these columns. Quotations are unchanged, as follows: Water Pipe, 4-inch, \$31; 6, 8, 10 and 12 inch, \$30; over 12-inch, \$29, with \$1 extra for Gas Pipe. Large municipal contracts are usually placed at somewhat lower basis.

Coke.—The Western Coke market, notwithstanding the Coal strike, continues weak, and low prices are being made on both West Virginia and Connellsville grades. High grade Connellsville Foundry Coke continues to be offered at \$5.55 to \$5.65, and \$5 is asked for Wise County product. On the other hand, By-Product Coke is firmly maintained on the basis of \$5.80, Chicago. As most of the Western foundries laid in large stocks to provide against a shortage, there is little buying and practically no contracting for future requirements.

Old Material.—Quotations on all grades of Scrap are practically without change and consumers generally are holding off. The Chicago & Northwestern Railroad has issued a list for the disposal of approximately 1500 tons of material. On account of the strength of the Pig Iron market slightly higher prices are anticipated in Scrap, although up to the present none of the consumers has evinced any desire to close for future requirements on the basis now prevailing. The range of prices paid by large consumers to producers and dealers, per gross ton, car lots, f.o.b. Chicago, is as follows:

Old Iron Rails.....	\$21.25 to \$21.50
Old Steel Rails, 4 feet and over.....	16.00 to 16.50
Old Steel Rails, less than 4 feet.....	14.00 to 14.50
Heavy Relaying Rails, subject to inspection, 50 pounds and under.....	27.00 to 27.50
Old Car Wheels.....	19.00 to 19.50
Heavy Melting Steel Scrap.....	13.50 to 14.00
Frogs, Switches and Guards.....	13.50 to 14.00
Mixed Steel.....	12.00 to 12.50

The following quotations are per net ton:

Iron Fish Plates.....	\$16.50 to \$17.00
Iron Car Axles.....	22.50 to 23.00
Steel Car Axles.....	18.00 to 18.50
No. 1 Railroad Wrought.....	14.50 to 15.00
No. 2 Railroad Wrought.....	13.50 to 14.00
Locomotive Tires, smooth.....	14.00 to 14.50
Railway Springs.....	13.50 to 14.00
No. 1 Dealers' Forge.....	12.00 to 12.50
Mixed Bushing.....	10.00 to 10.50
Iron Axle Turnings.....	11.00 to 11.50
Soft Steel Axle Turnings.....	11.00 to 11.50
Machine Shop Turnings.....	11.00 to 11.50
Cast Borings.....	9.00 to 9.25
Mixed Borings, &c.....	9.00 to 9.25
No. 1 Mill.....	9.00 to 9.25
No. 2 Mill.....	8.00 to 8.25
No. 1 Boilers, cut to Sheets and Rings.....	9.50 to 10.00
No. 1 Cast Scrap.....	13.25 to 13.75
Stove Plate and Light Cast Scrap.....	10.50 to 11.00
Railroad Malleable.....	13.50 to 14.00
Agricultural Malleable.....	12.50 to 13.00

The Parker Boiler Company has removed its Chicago office to 1128 Marquette Building. The general office and

sales department of the company are located in the Pennsylvania Building, Fifteenth and Chestnut streets, Philadelphia, Pa.

The Pennsylvania Steel Company announces the establishment of separate offices in Chicago, at room 305, Western Union Building. The new offices were opened for business May 1, with Robert E. Belknap as resident agent.

M. Cohen & Son, Scrap Iron dealers, Chicago, announce the removal of their office at 804 Fisher Building, to their storage and railroad yard, Thirty-ninth street and Ashland avenue.

B. Nicoll & Co., Iron and Steel merchants, 59 Wall street, New York, will open an office at 1722 First National Bank Building, Chicago, with H. W. Rolfe and I. T. Rolfe, formerly connected with R. M. Cherrie & Co., as resident managers. This branch office will deal in Pig Iron, Scrap, Coal and Coke.

The Chicago office of the Tennessee Coal, Iron & Railroad Company, in the Rookery Building, with A. H. Carpenter as resident manager, has been closed, and the affairs of this company in Chicago and the West will hereafter be handled by the Chicago office of the Republic Iron & Steel Company. Mr. Carpenter has been appointed assistant sales agent.

Philadelphia.

REAL ESTATE TRUST BUILDING, May 1, 1906.

As a rule prices are steady, Foundry and Malleable Irons being particularly scarce and held at somewhat higher prices. Basic Iron, however, is not holding its own as well as was expected, two or three good sized lots having been sold for the third quarter's delivery at about \$17.75. Some claim that they have done a little better than that. The truth of the matter is the situation is unusually complicated. What with the miners' strike and the financial disturbances, it is hard to know just where we are at. The demand for finished products (except Structural Shapes) is not quite as good as it was and is causing some disappointment. Specifications are coming in freely, however, and for the present mills are pretty well employed, although they would be glad to see more new business. The complications to which we have referred, as well as the absence of definite knowledge in regard to the crops, are no doubt causing a feeling of conservatism which will probably continue until more definite knowledge can be obtained in regard to these matters, but it is surprising how well business holds up considering the strain which it is going through.

Pig Iron.—The market is somewhat of a mixture this week, strong in some lines, in others a little weak. The strength, however, is mainly for May, June and July Shipments. The prices for the last half of the year do not seem to interest buyers to any great extent. There is a great scarcity of Foundry Iron, but other descriptions seem to be in pretty good supply. The strength of the market is believed to be based on the scarcity of fuel and the extremely small stocks the furnaces are carrying. The indifference in regard to the last half of the year is no doubt based on the possibility of business contraction, and until that feature is more fully developed buyers are not inclined to make heavy commitments. Of course the clouds which hang over the horizon may be dissipated in the course of a few weeks, but confidence has been so rudely shaken that there is not much disposition to enter into heavy engagements until the outlook becomes more settled. When the crops become more advanced and the San Francisco losses are arranged, things may have a different appearance, but in the meanwhile there is no doubt that they exercise a depressing influence, and it could hardly be otherwise. The demand for Foundry Irons, as we have already mentioned, is very good, and prices are getting pretty close to \$19 for No. 2 X Foundry, the range being \$18.60 to \$18.85. No. 3 and No. 4 Foundry Irons are also in good demand, and would bring \$16.25 to \$16.75. Mills Irons are dull, considerable quantities having been sold at \$16.25, delivered, for standard brands. Basic is quoted at \$18, for May and June, but later months can be done at \$17.75; some buyers say better than that. The general list for Philadelphia and nearby deliveries may be quoted as follows:

No. 1 X Foundry.....	\$19.25 to \$19.50
No. 2 X Foundry.....	18.50 to 19.00
No. 2 Plain.....	18.25 to 18.50
Standard Gray Forge.....	16.50 to 16.75
Ordinary Gray Forge.....	16.00 to 16.25
Basic.....	17.75 to 18.00
Low Phosphorus.....	25.00 to 25.50
Malleable.....	19.25 to 19.75
Bessemer.....	19.75 to 20.00

Steel.—The demand is fully maintained and prices are strong as last quoted—namely, \$29 to \$30 for Ordinary Open Hearth and \$32.50 to \$35 for Forging Billets. Mills have a large tonnage on their books, and the week's deliveries are replaced with new orders to be filled as promptly as possible.

Steel Alloys.—There is not much new business and prices are rather inclined to weaken, as arrivals are now

quite heavy. Prices are nominally the same as last week, but on the right kind of bids concessions could be had.

Plates.—The market is a little quiet, although the mills are still busy on old contracts. There seems to be a good deal of hesitancy, however, in making further engagements until the financial situation clears up somewhat. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.73½	1.78½
Flange or Boiler Steel.....	1.83½	1.88½
Marine.....	2.13½	2.18½
Locomotive Fire Box Steel.....	2.23½	2.28½

The above are base prices for ¼-inch and heavier. The following extras apply:

	Extra per 100 pounds.
3-16-inch thick.....	\$0.10
Nos. 7 and 8, B. W. G.....	.15
No. 9, B. W. G.....	.25
Plates over 100 to 110 inches.....	.05
Plates over 110 to 115 inches.....	.10
Plates over 115 to 120 inches.....	.15
Plates over 120 to 125 inches.....	.25
Plates over 125 to 130 inches.....	.50
Plates over 130 inches.....	1.00

Structural Material.—There is only about the usual business doing in this neighborhood, although, of course, that is about sufficient to keep the mills fully employed.

Bars.—There is not much new work coming in, and the market has rather a dull appearance. Specifications keep up very well, however, and to that extent the situation is satisfactory, although some of the mills begin to feel the need of new business. Prices are unchanged and fairly steady at 1.63½c. to 1.68½c. for either Iron or Steel Bars.

Sheets.—The promise of a better market which appeared imminent during the last week or two has not been realized, although prices are unchanged as follows: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c., and No. 28, 2.80c.

Old Material.—The market is not particularly active, but it maintains a strong tone, and the full prices of last week are fully maintained, with bids and offers for deliveries in buyers' yards about as follows:

Scrap Steel Rails and Crops.....	\$17.25 to \$17.50
No. 1 Steel Scrap.....	17.00 to 17.25
Low Phosphorus Scrap.....	21.00 to 22.00
Old Steel Axles.....	20.50 to 21.00
Old Iron Axles.....	26.00 to 26.50
Old Iron Rails.....	21.50 to 22.00
Old Car Wheels.....	16.75 to 17.00
Choice Scrap, R. R., No. 1 Wrought.....	20.50 to 21.00
No. 1 Yard Scrap.....	18.50 to 19.00
Long and Short.....	17.00 to 18.00
Machinery Scrap.....	15.50 to 16.00
Wrought Iron Pipe.....	15.00 to 16.00
No. 1 Forge Fire Scrap.....	15.50 to 16.00
No. 2 Light Ordinary.....	11.25 to 11.75
Wrought Turnings.....	14.00 to 14.50
Axle Turnings, Choice Heavy.....	14.50 to 15.00

Pittsburgh.

PARK BUILDING, May 2, 1906.—(By Telegraph.)

Pig Iron.—The Ore handlers at the lower lake ports having gone out on a strike no Ore is being loaded at any of these ports. How long the trouble may last is a matter of conjecture, but if it should continue any length of time it will seriously embarrass many blast furnaces in the Central West, as they will not be able to get Ore. The United States Steel Corporation will not be affected to any great extent, as it will divert its Ore to its docks at Conneaut Harbor, Ohio, where no trouble exists. There has been a good deal of activity in Bessemer and Basic Pig Iron in the past week and some heavy sales have been made. The Steel Corporation has bought 15,000 tons or more of Bessemer Iron from the Bessemer Pig Iron Association at \$17.25, Valley furnace, and about 1500 tons of Basic at \$17, Valley furnace, all for May delivery. There have also been sales to other parties of upward of 20,000 tons of Basic for extended delivery at \$17, Valley furnace, one Chicago interest taking 10,000 tons at about \$16.70, Valley furnace. We quote Bessemer Iron at \$17.25 and Basic at \$17, Valley furnace. There is not much inquiry for Foundry Iron and we quote Northern brands at \$16.50 to \$17, Valley furnace, for No. 2 Foundry. There is some demand for Forge Iron and we quote Northern brands at \$15.75, Valley furnace, or \$16.60, Pittsburgh.

Steel.—We note a continued shortage in the supply of Bessemer and Open Hearth Steel, particularly in Sheet and Tin Bars, deliveries of these by the mills being very unsatisfactory to consumers. We quote Bessemer Billets at \$27, and Open Hearth \$28, Pittsburgh, but small sales of Bessemer Billets have recently been made as low as \$26, and Open Hearth at about \$27, Pittsburgh. Sheet and Tin Bars in random lengths are held at about \$28, Pittsburgh, with an advance of 50c. a ton for Cut Bars.

(By Mail.)

The Bessemer Pig Iron Association sold Tuesday to the United States Steel Corporation the balance of its Bessemer Iron for May delivery, amounting to about 15,000 tons, at \$17.25, at Valley furnace, and also about 1500 tons of Basic Iron for same delivery at \$17, at Valley furnace. The Pig Iron Association has not sold any of its June Iron, and has upward of 30,000 tons of Bessemer, and also a large tonnage of Basic for that delivery. The market on Basic Iron has been very active in the past week. Prices of Bessemer Iron are very firm at \$17.25 to \$17.50, Valley furnace, while Basic is firm at \$17, at furnace. There is only a fair inquiry for Foundry Iron, Northern brands of No. 2 being held at \$16.50 to \$17, Valley furnace. There is some demand for Forge Iron, and we quote Northern brands at \$15.75, Valley furnace, or \$16.60, Pittsburgh. There is still a great scarcity of Steel, particularly Open Hearth, and with the putting of the entire Ohio works of the Carnegie Steel Company on Rails, which will be done before long, the situation will be worse instead of better. As yet, the only actual inquiry from San Francisco is one for 500 tons of Standard Steel Rails received by the Carnegie Steel Company. No orders have yet come in for Structural Steel, but a good deal of tonnage in Merchant sizes of Pipe will be needed to replace broken gas and water lines. The demand for Finished Iron and Steel is fairly active, and some large inquiries for Line Pipe are coming up. The demand for Coke is not quite so active, but prices are firm. Scrap is neglected, and prices are rather weak. Details regarding the lake shipping strike are rather meager, but if it should last for any time it would seriously embarrass the blast furnaces, as it would mean a shortage in Ore receipts.

Ferromanganese.—We continue to quote prompt shipment at \$105 to \$110, Pittsburgh, but the demand is quiet. For June and July delivery \$90 is quoted.

Muck Bar.—There is practically no demand. We quote best grades of Muck Bar made from all Pig Iron at \$28.50 to \$29, Pittsburgh. Muck Bar made from Scrap is held at about \$26, but this price would probably be shaded.

Steel Rails.—Very little new business has been placed, the Nickel Plate buying 5000 tons. The New York Central, however, is figuring on 10,000 tons additional. The fact that the Rail mills have fixed a price on Rails for next year delivery has evidently created the impression among some of the railroads that the mills have no more Rails to sell for this year's delivery. This is wrong, as the Carnegie Steel Company has some rolling capacity yet open for last quarter, probably about 200,000 tons. The Ohio works of the Carnegie Steel Company is now on Rails and Billets, but it is the intention to put the entire plant on Rails before long. The demand for Light Rails is very active and prices are firm. We quote Standard Sections at \$28 at mill. We quote Light Rails as follows: 8-lb., \$36; 10-lb., \$32; 12-lb., \$30; 16-lb., \$29; 20-lb., \$28.50; 25 to 45 lb., \$27.50 to \$28, maker's mill.

Rods.—The market on Rods is very firm, and there is a good deal of inquiry. The two leading producers are not selling in the open market, which causes a limited supply. We quote Bessemer and Open Hearth Rods at \$34.50 to \$35, Pittsburgh. We quote Chain Rods at \$35, but the demand is quiet.

Skelp.—Not much new business is being placed, but the mills are well employed on contracts and prices are firm. We quote: Grooved Steel Skelp, 1.57½c. to 1.60c.; Sheared Steel Skelp, 1.60c. to 1.65c.; Grooved Iron Skelp, 1.65c. to 1.70c.; Sheared Iron Skelp, 1.75c. to 1.80c., Pittsburgh, these prices being for ordinary widths and gauges.

Structural Material.—No large contracts have recently been placed in this district, but there is a good deal of work in sight, part of which may go over until next year on account of the crowded condition of the leading Structural concerns, which are filled up for months ahead. The tonnage of the American Bridge Company in April was a little less than in March, amounting to about 52,000 tons. No actual inquiries have come in from San Francisco and none are expected for some time. Prices for mill shipments are as follows: Beams and Channels, up to 15-inch, 1.70c.; over 15-inch, 1.80c.; Angles, 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.75c.; 8 x 8 and 7 x 3½ inches, 1.80c.; Tees, 3-inch and larger, 1.70c.; Tees, 3-inch and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-inch are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—The general demand is said to be better and a good deal of tonnage is in sight. It is stated that the Pennsylvania Railroad will place contracts in a few days for 20,000 Steel cars, which will take about 200,000 tons of Plates and other Shapes, while another inquiry is in the market for 17,000 tons of narrow Plates for a Pipe line. The mills have pretty well caught up on contracts and can now make shipments within two or three weeks from receipt of order. Prices are quite firm, but on the narrow sizes continue to be shaded by some mills about \$1 a ton. We quote as follows: Tank Plates, ¼-inch thick, 6¼ up to 100 inches

in width, 1.60c., base, at mills, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16-inch Plates on thin edge.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 inches.....	.05
Plates over 110 to 115 inches.....	.10
Plates over 115 to 120 inches.....	.15
Plates over 120 to 125 inches.....	.25
Plates over 125 to 130 inches.....	.50
Plates over 130 inches.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. R. M. A." and ordinary Fire Box Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 inches wide down to 6 inches of Tank, Ship or Bridge quality.

Sheets.—Prices on both Black and Galvanized Sheets are reported as being somewhat firmer, some concerns that were making concessions of as much as \$2 a ton having withdrawn them. A moderate amount of new work is being placed, and this, with old contracts, insures steady operation of the Sheet mills to July 1 or longer. The leading interest is so crowded with orders that it is much behind in deliveries. We quote: Black Sheets, Box Annealed, one pass through cold rolls, Nos. 10 to 12 gauge, 1.95c. to 2c.; Nos. 13 and 14, 2c. to 2.05c.; Nos. 15 and 16, 2.05c. to 2.10c.; Nos. 17 to 21, 2.10c. to 2.15c.; Nos. 22 to 24, 2.15c. to 2.20c.; Nos. 25 and 26, 2.20c. to 2.25c.; No. 27, 2.25c. to 2.30c.; No. 28, 2.35c. to 2.40c.; No. 29, 2.50c. to 2.55c., and No. 30, 2.60c. to 2.65c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.30c. to 2.35c.; Nos. 12 to 14, 2.40c. to 2.45c.; Nos. 15 and 16, 2.50c. to 2.55c.; Nos. 17 to 21, 2.65c. to 2.70c.; Nos. 22 to 24, 2.80c. to 2.85c.; Nos. 25 and 26, 3c. to 3.05c.; No. 27, 3.20c. to 3.25c.; No. 28, 3.40c. to 3.45c.; No. 29, 3.65c. to 3.70c., and No. 30, 3.90c. to 3.95c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.60 to \$1.65 per square, and Galvanized Roofing Sheets, No. 28 gauge, at \$2.95 to \$3 per square for 2-inch corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Bars.—Since the heavy contracts of the implement trade were placed for Steel Bars, and which are said to have aggregated about 250,000 tons, new business has been rather light, but specifications on contracts are coming in freely and shipments by the mills are very heavy. The demand for Iron Bars is heavier, good sized contracts being placed by the wagon and implement makers. No trouble is anticipated this year in arranging the Amalgamated scales with the Bar mills and no shut down because of labor troubles is anticipated. We quote Iron and Steel Bars at 1.50c., base, half extras, for carloads and larger lots, f.o.b. Pittsburgh.

Cotton Ties.—Some orders are still being placed at the agreed price of 85c. per bundle.

Hoops and Bands.—The mills are running mostly on old contracts, on which buyers are specifying freely. New orders are rather light. There is no change in prices.

Tin Plate.—The mills are very busy on old contracts, most of which were taken when prices were lower than they are now, but a fair amount of new business is coming in, mostly for fall delivery. Official prices of Tin Plate as made some time ago are not being rigidly held, but are being shaded more or less, depending on the order. We quote Tin Plate at \$3.60 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in ten days, on which price a rebate of 5c. a box is allowed for carloads and larger lots.

Merchant Steel.—Large contracts for Steel are now being placed by the implement trade, while the general demand is only fair. The market is quite firm and prices named below are being generally held: Planished or Smooth Finished Tire Steel, 1.70c.; Iron Finish up to 1½ x ½ inch, 1.65c., and Iron Finish, 1½ x ½ inch and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ¾ and 1 inch, 2c., and 1½-inch and larger, 1.90c.; Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.75c. to 1.80c.; Cutter Shoes, 2.20c. to 2.25c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. discount in carloads and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—We note a fair demand, and the market is firm at \$2 to \$2.05, Pittsburgh, per 100 lbs.

Spelter.—The demand is dull, but prices are fairly strong. We quote prime grades of Western Spelter at 5.90c., St. Louis, equal to 6.02½c., Pittsburgh.

Merchant Pipe.—The Eastern Oil Company contract for 116 miles of 10 and 12 inch Line Pipe, referred to last week, has not yet been placed. The Ohio Fuel Supply Company is now figuring on the purchase of about 60 miles of 12-inch Line Pipe for taking gas from Uniontown, Pa., to Johnstown, Pa., but the Line if placed may be partly 16-inch Pipe. An inquiry is also reported from Hamilton, Ontario, Canada, for 40 to 50 miles of 4, 6 and 8 inch Pipe, but nothing has been done with it as yet. On the larger sizes of Pipe the mills are filled up for some months. An active demand for Merchant sizes of Pipe is expected from San Francisco to replace broken gas and water mains. The general situation in the trade is quite satisfactory as far as new business is concerned, but prices are very low, the discount on Merchant sizes of Steel Pipe remaining at 81 per cent. off. Discounts, which are shaded one point, are as follows:

Merchant Pipe.

	Jobbers, carloads.			
	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
½ and ¾ inch.....	72	56	69	53
¾ inch.....	74	60	71	57
1 inch.....	76	64	73	61
1½ to 6 inches.....	80	70	77½	67½
7 to 12 inches.....	75	60	72½	57
Extra strong, plain ends:				
½ to ¾ inch.....	65	53	62	50
¾ to 1 inch.....	72	60	69	57
1½ to 8 inches.....	68	56	65	53
Double extra strong, plain ends:				
½ to 8 inches.....	61	50	58	47

Boiler Tubes.—The shading in prices of Merchant Tubes, which has been repeatedly noted in this report, has become more pronounced, and the mills are now taking orders at prices which are three points, or \$6 a ton, below the official discounts, and it is stated that even a larger discount is allowed on attractive orders. On Locomotive Tubes prices are firm, discounts on these being as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ inches.....	41	46
1½ to 2¼ inches.....	41	58
2½ inches.....	46	60
2½ to 5 inches.....	53	66
6 to 13 inches.....	41	58

Iron and Steel Scrap.—The demand is only fair, and is mostly for small lots. Large consumers are not in urgent need of Scrap, and are holding off, believing that later on they will be able to buy at lower prices. At present prices of Heavy Steel Scrap are at least \$2.50 a ton lower than Bessemer Pig Iron, which is an unusual condition. A large consumer is expected in the market within a short time for upward of 10,000 tons of various kinds of Scrap, and inquiries will probably be sent out within a short time. Dealers quote as follows: Heavy Melting Scrap, \$15; No. 1 Wrought Scrap, \$17; Bundled Sheet Scrap, \$14 to \$14.25; Machinery Cast Scrap, \$15 to \$15.25; Old Steel Rails, short pieces, \$15; Old Steel Rails, long pieces for rerolling, \$15.50; Cast Iron Borings, \$8 to \$8.25; Old Car Wheels, \$17.25 to \$17.50; Old Iron Axles, \$24 to \$24.50; Old Steel Axles, \$20 to \$20.50; Wrought Turnings, \$12; all in gross tons, f.o.b. cars, Pittsburgh. We note sales as follows: 400 tons Machinery Cast Scrap, \$15.25; 200 tons No. 1 Railroad Wrought Scrap, \$17; 500 tons of Turnings, 12, and 500 tons of Heavy Steel Scrap at about \$15. All these sales are f.o.b. Pittsburgh.

Coke.—The demand for both Furnace and Foundry Coke is not as active as it was, and output and shipments in the Connellsville region show a falling off. We quote strictly Connellsville Furnace Coke at \$2.65 to \$2.75 and 72-hour Connellsville Foundry Coke at \$3 to \$3.10 at oven. Main Line Coke made outside of the Connellsville region and which runs higher in phosphorus than strictly Connellsville is sold at lower prices, Furnace Coke at about \$2.25 and Foundry at \$2.60 to \$2.75 at oven. The output last week in the Upper and Lower Connellsville regions was about 368,000 tons, a falling off from the previous week of nearly 5000 tons.

The San Francisco offices of the National Tube Company, the Carnegie Steel Company and the American Bridge Company are now located at Folsom and Sixteenth streets. In the same building are the offices of the American Steel & Wire Company, so that four of the constituent interests of the Steel Corporation are now located at the same address. This will continue until arrangements can be made for separate offices.

British steel rail exports in 1906 have been disappointing thus far. For March the total was 25,326 gross tons, as compared with 45,305 tons in March, 1905, and 29,905 tons in March, 1904. The demand from British colonies has been falling off steadily, the total in March, 1904, from the colonies being 22,809 tons; in March, 1905, 18,254 tons, and in March, 1906, 9729 tons.

Cincinnati.

FIFTH AND MAIN STS., May 2, 1906.—(By Telegraph.)

Pig Iron.—A stronger tone is evident, although prices have not perceptibly advanced. We hear of considerable buying being done in contiguous territory, but in this immediate vicinity a comparatively light tonnage has been sold. The bulk of this business was in Northern Iron, at \$16 at furnace, although a strong effort has been made to hold for higher prices. Southern brands have been in less demand, which can be traceable in a large degree to the great difference in price in favor of the Northern product. While it is plainly apparent that \$16 at furnace is well established, it is also reasonably certain that this figure contemplates quick delivery only, and that forward shipments cannot be had for less than \$16.50. We learn of some brands of Southern Iron that can be bought on quick terms as low as \$13.50, but this figure is at least 25c. below the general minimum. From all reports it looks as though the established schedule on all strictly Birmingham Irons is \$14, with a very limited number of sales at this figure. It would appear from the deliberate movements being made by the heavy melters and the apparent reluctance with which they are coming forward, as though they were prepared to bide their time until forced by extreme necessity to cover for the remainder of the year. It is anticipated that within the next 30 days the agricultural interests will buy sufficient tonnage to carry them for 12 months. We learn of a sale of 1000 tons of Southern and 600 tons of Northern to a melter in Indiana, another from the same district of 500 tons of Northern and yet another of 600 tons of Southern, all for last half. In the way of inquiries we note 600 tons of Southern and 400 tons of Northern from a central Ohio stove concern, and one or two of small tonnage from other points. Freight rates from Hanging Rock district are \$1.15, and from Birmingham \$3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$17.25 to \$17.50
Southern Coke, No. 2.....	16.75 to 17.00
Southern Coke, No. 3.....	16.25 to 16.50
Southern Coke, No. 4.....	15.75 to 16.00
Southern Coke, No. 1 Soft.....	17.25 to 17.50
Southern Coke, No. 2 Soft.....	16.75 to 17.00
Southern Coke, Gray Forge.....	15.00 to 15.25
Southern Coke, Mottled.....	14.50 to 14.75
Ohio Silvery, No. 1 (8 per cent. Silicon).....	21.65 to 22.15
Lake Superior Coke, No. 1.....	17.65 to 18.15
Lake Superior Coke, No. 2.....	17.15 to 17.65
Lake Superior Coke, No. 3.....	16.65 to 17.15

Car Wheel Irons.

Standard Southern Car Wheel.....	\$23.50 to \$24.00
Lake Superior Car Wheel.....	22.00 to 22.50

Coke.—The Coke market is rather quiet and easy. A full supply in every particular is readily obtainable and consumers appear to be well taken care of. We quote best brands of Virginia and Connellsville Foundry Coke from \$2.75 to \$3, f.o.b. ovens.

Finished Iron and Steel.—There is possibly a little easier tone to this market, and while contracts are booked for some months ahead there is not the urgency noted that obtained some weeks since. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, 1 x ¼ inch or heavier, 1.83c., in carload lots.

Old Material.—A little more strength is noted in the Scrap Iron market, but there does not appear to be anything in sight that gives promise of anything of great magnitude. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$15 to \$15.50 per net ton; Cast Borings, \$8.50 to \$9 per net ton; No. 1 Cast Scrap, \$12 to \$13 per net ton; Iron Rails, \$22 to \$22.50 per gross ton; Steel Rails, rolling mill lengths, \$15 to \$16 per gross ton; Relaying Rails, 56 lbs. and upward, \$28 to \$29 per gross ton; Iron Axles, \$24 to \$24.50 per net ton; Car Wheels, \$18.50 to \$19.50 per gross ton; Low Phosphorus Scrap, \$18 to \$19 per gross ton.

Commencing May 1, the sales agencies of the Republic Iron & Steel Company and the Tennessee Coal, Iron & Railroad Company will be consolidated under one head, with offices on the 15th floor of the First National Bank Building. M. E. McKee, who succeeded D. M. Forker as sales agent of the Republic, will be in charge, while Willard Wilson, who has been in charge of the Tennessee interests since January, will be transferred to Birmingham, where he will assume the duties of assistant general manager of sales.

The entire upper lake region and Northwest are dependent upon Pennsylvania, West Virginia, Ohio, Indiana and Illinois for their supply of coal. Buffalo handles fully nine-tenths of the anthracite lake shipments, while about three-fifths of the bituminous coal is shipped from

the three Lake Erie ports of Ashtabula, Cleveland and Toledo.

Cleveland.

CLEVELAND, OHIO, May 1, 1906.

Iron Ore.—The lake Ore docks were tied up last night at midnight on an order from the officials of the Longshoremen's Union, and will probably remain idle during the better part of May. This is due to the refusal of the Dock Managers' Association to recognize the union of the mates affiliated with the longshoremen. Other strikes in sympathy with this one are likely to tie up lake navigation completely, even though the dock companies were disposed to try to operate their plants with nonunion labor. Every possible effort was made by the dock managers to avert the difficulty. They offered by letter and telegraph to pay the men last year's scale and give them last year's hours if they would continue at work until a conference could be called. The longshoremen ignored the letters and telegrams and called the men out. Operation of the docks will now be impossible with union labor until Samuel Gompers, president of the American Federation of Labor, shall give his decision as arbitrator on the question of affiliation of the Mates' Union. The strike comes at an embarrassing time for the furnaces in this territory. Some of them have been complaining of a light supply of Ore, indicating that even with the new Ore their needs were not being met. Some few furnaces are well fixed, but none are in shape to stand a month without an additional supply. It is generally admitted that the stocks of Ore on hand are smaller than they have been on May 1 for years. In addition the movement up to the end of April was less than had been expected. The supply on hand, therefore, was light when the docks became idle. Last year in May the movement was close to 4,000,000 tons. This year June 1 will likely see a falling off of 4,500,000 tons from the amount shipped to that date a year ago. In addition to this is the shorter supply of Ore on the docks. The furnaces are not showing any let up in their operations. The decision of President Gompers on the question of the affiliation of the matter is not looked for before May 15.

Pig Iron.—The foundry trade has shown a steady stream of orders coming from all quarters during the past week. Some of these, who held off for a time, hoping to better the price of \$16.50 in the Valley for No. 2, are now coming in on that basis. They were unable to get lower figures and ran against some furnaces which were holding for \$17 and upward. One furnaceman bought a good supply of Pig Iron for fourth quarter delivery, intending to use part of it in the first quarter of next year. Many buyers are covering, fearing that the lake labor difficulty will shut down the furnaces, lessen the supply for the time being and cause an advance later. In addition the present heavy buying for third and fourth quarter delivery is rapidly filling up the furnaces. That part of the Pig Iron market is strong. The demand for Basic and Bessemer also shows improvement and the price is still firm at \$17.25 in the Valleys. Coke is easier.

Finished Iron and Steel.—The Billet situation is still the center of interest in the market here. Forging Billets are still to be had at \$35, Pittsburgh, but consumers are reporting that they cannot use Steel at that price and expect to make sales. Some concerns have been losing business because they advanced the price on their forgings. Bessemer Re-rolling Billets are extremely scarce and sell for about \$30, Pittsburgh. Some confusion exists in the Bar trade because of the temporary concessions in prices to the agricultural implement works. The question has been raised as to where the line is to be drawn; whether on a tonnage basis or on the character of the consumer's output. Prices are holding at 1.50c. for both Bessemer and Open Hearth. Bar Iron shows a decline for the week and is now on about the same basis as Steel, although some producers are holding for 1.60c. at the mill. The demand for Sheets is still good, although some little cutting has been done. This is said to indicate that the smaller mills are again getting short of orders. Sheets out of stock are, as heretofore, on the basis of 2.15c. for No. 10 Black Sheets, 2.70c. for No. 28, One Pass Cold Rolled, and 3.70c. for No. 28 Galvanized. The market is fairly active at these prices, most of the business here being done out of stock. The Plate trade is steady, with only a light demand, and mills are still reporting some difficulty in getting specifications against old contracts. The smaller sized Angles are plentiful, but larger sizes are hard to obtain, despite the increased production. The difficulty is not in the productive capacity, but in the shortage of Steel.

Old Material.—The Scrap market is slow. Prices are steady and buying is light, the mills holding off. The following represent dealers' prices to the trade, f.o.b. Cleveland, gross tons: Old Steel Rails, \$14.50 to \$15.50; Old Iron Rails, \$22 to \$23; Iron Car Axles, \$18.50 to \$19.50; Heavy Melting Steel, \$14.50 to \$15. Net tons: Cast Borings, \$8.50 to \$9; No. 1 Busheling, \$12.50 to \$13; No. 1 Railroad Wrought, \$15 to \$16; No. 1 Cast, \$13.50 to \$14.50; Stove Plate, \$10.50 to \$11; Iron and Steel Turnings and Drillings, \$9.50 to \$10.50.

Birmingham.

BIRMINGHAM, ALA., April 30, 1906.

Pig Iron.—Indications are that the market has not been quite so active this week as last. While inquiries are numerous, no great amount of tonnage has been booked. Orders being placed are principally for shipment up to July and August, with some few buying for the balance of the year. The price of \$14 for No. 2 is being maintained for both present and future delivery. Shipments are moving freely and no stocks are accumulating in the yards here. Producers express themselves as being entirely satisfied with prevailing conditions.

No. 3 Furnace of the Republic Iron & Steel Company, at Thomas, which has been out of blast for several months undergoing general repairs, will be blown in within the next week or so. It is understood this stack will make Basic Iron for the Tennessee Company's Steel plant at Ensley.

Adler Brothers have bought the interest of E. M. Tutwiler in the Tutwiler Coal, Coke & Iron Company, paying, it is reported, \$1,680,000. This property consists of one furnace at Boyles and some of the most valuable mineral land in the State. Morris Adler states they will at once begin the erection of another furnace, to be completed within the next 12 months. The present stack will be blown out in the next 30 days for general repairs and relining, which it is estimated will require 60 days.

The Southern Steel Company's furnace at Gadsden will be closed down May 1 for relining and general repairs, which will require some 60 days. This will not, however, affect its Steel plant, arrangements having been made to secure Basic Iron from other furnaces in the district.

Cast Iron Pipe.—The American Cast Iron Pipe Company is on the homestretch of its construction work, and indications are that this magnificent plant will be in commission as a producer of Water and Gas Pipe within the next ten days. The electric cranes that are being installed by the Cleveland Crane & Car Company of Wickliffe, Ohio, from special designs of the Pipe Company, are models of effective mechanism. There are many modern labor saving devices in every department, and it is confidently believed by the management that the cost of production will be considerably lower than in the old style foundries. The company enters the field with a long list of desirable orders. The demand on the tonnage of the Southern shops has been unusually great for the past six months. Among the large orders advertised for letting in the near future are New Orleans, La., and Cienfuegos, Cuba. The following prices are understood to be ruling on Water Pipe per net ton, f.o.b. cars at foundry:

4 inch to 6 inch.....	\$27.00
8 inch to 10 inch.....	26.00
12 inch to 20 inch.....	25.00
24 inch to 48 inch.....	24.00
Gas Pipe \$1 per ton extra.	

Old Material.—Dealers report an improvement over last week, with all grades, especially No. 1 Machinery, in good demand. A general advance of 25c. per ton has been made and quotations are approximately as follows per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$17.75 to \$18.25
Old Iron Axles.....	18.25 to 18.75
Old Steel Axles.....	16.25 to 17.25
Old Car Wheels.....	16.25 to 16.75
No. 1 Railroad Wrought.....	15.25 to 15.75
No. 2 Railroad Wrought.....	14.75 to 15.25
No. 1 Country Wrought.....	13.75 to 14.25
No. 2 Country Wrought.....	11.75 to 12.25
Wrought Pipe and Flues.....	11.75 to 12.25
Railroad Malleable.....	11.75 to 12.25
Mixed Steel.....	9.75 to 10.25
No. 1 Machinery Cast.....	11.25 to 11.75
Stove Plates and Light Cast.....	9.25 to 9.75

Douglas H. Gordon and associates of Baltimore have just closed a deal for 1000 acres of Ore land in Talladega County, for which, it is reported, \$31,000 was paid. This is the new Gray Ore and adjoins that now being worked very successfully by the Alabama Consolidated.

An error was inadvertently made in the Birmingham market report published in our issue for April 19, which stated that "the old Citico Furnace at Chattanooga, which was bought some months since by the Lacey-Buek Iron Company, has been rebuilt and will be blown in within the next few days." We are advised that the furnace is still owned by the Citico Furnace Company, which has not retired from the Iron business, but is regularly operating the furnace and is making its usual shipments to the Iron trade.

The evening of Monday, May 7, is the regular date for the monthly meeting of the Pittsburgh Foundrymen's Association, but it will be devoted to a visit by the members to the works of the Pennsylvania Car Wheel Company in Allegheny, Pa., to witness the operation of machines used in this plant for casting car wheels.

New York.

NEW YORK, May 2, 1906.

Pig Iron.—The market has been irregular and is somewhat weaker, concessions having become somewhat more numerous. The effect of the suspension of mining in the Anthracite Coal districts has not yet been very notable on production and is counterbalanced by a moderate accumulation of stocks during the past month at Eastern furnaces. Orders on hand, too, have fallen off somewhat. The Steel Corporation is reported to have purchased 18,000 tons for third quarter delivery, for the Pencoyd works, at a concession, and other sales of Basic have been made at \$17.75, delivered. Some lower prices have been made on Foundry Iron west of the Hudson River by Buffalo furnaces, and the opening of the Erie Canal is expected to extend this competition in this district. A Tennessee furnace has made further sales in New England, at a price equivalent to \$13.50, Birmingham, although the leading interests continue firm at \$14 for No. 2. We continue to quote: Northern Iron, No. 1 Foundry, \$18.50 to \$19; No. 2 Foundry, \$18 to \$18.75; No. 2 Plain, \$17.50 to \$18. Southern Iron is quoted at \$18.25 to \$18.50 for No. 1 Foundry and \$17.25 to \$17.50 for No. 2 Foundry.

Steel Rails.—The fixing of the price of Steel Rails for 1907 delivery at \$28 has been followed by the placing of some large business for next year, including 100,000 tons for the Chicago, Milwaukee & St. Paul, 50,000 tons for the Chicago Great Western and 40,000 tons for the Northern Pacific. There are pending 200,000 tons additional of Bessemer Rails and a round tonnage of Open Hearth Rails. Among contracts placed in the past week for delivery this year are the following: Nickel Plate, 5000 tons; New York Central, 6500 tons; Boston & Maine, 6000 tons; Michigan Central, 2000 tons; Vandalia, 6800 tons; Delaware & Hudson, 17,000 tons.

Structural Materials.—Bids for the Manhattan Bridge were to have been opened on April 30, but two injunctions were served on Bridge Commissioner Stevenson on Monday. One of these enjoined him from receiving bids, but it was modified afterward so as to enjoin opening the bids. Henry T. Chapman brought one action, his petition alleging extravagance on the part of the City of New York since one contract had already been entered into for this bridge, referring to that made in 1905 with the Pennsylvania Steel Company. It was urged that to let another contract while the first was still in the courts would involve the city in expensive litigation. The second action was brought on the ground that the Department of Bridges should have advertised for bids for a bridge of eye bar construction as well as for a Wire cable bridge. Six bids were in the hands of the Commissioner, these coming from the following companies: Ryan & Parker, Monad Engineering Company, Milliken Brothers, John Peirce Company and American Bridge Company, all of New York, and the King Bridge Company, Cleveland, Ohio. The Pennsylvania Steel Company, which received the contract last year at \$7,284,739, did not put in another bid, as it holds that the first award still stands. The company's appeal from the decision of the Court declaring the contract void is still pending. The specifications for the bridge call for 41,864 net tons of Steel. The tonnage of new business closed in the past week by fabricating companies is relatively small, and the large projects that are to be carried out in New York still wait. There is a disposition in some quarters to get more light on the effect of recent happenings on the general business situation. A bridge for the New Orleans & Northern Railroad requiring 2000 tons has been placed, and in New York a contract has been let by Henry Corn to the Hay Foundry & Iron Works for a building on Fifth avenue near Thirty-fifth street. About 1600 tons of Steel will be required. Structural Steel manufacturers are informed of orders for about 20,000 Steel cars that are under negotiation. San Francisco business is expected to be slow in materializing, though a beginning has been made, one New York office having booked 6000 tons. Inquiries have been made from numerous sources for German Steel for San Francisco, but it is difficult to tell how much of this is duplication and how much comes from bona fide buyers. German Steel is still sold at £6, c.i.f. New York, and some business for this country has been taken on that basis for delivery in the second half of the year. We quote as follows on mill shipments of Shapes for tidewater deliveries: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. Beams, 18 to 24 inch, 0.10c. extra; Angles over 6 inches, 0.10c. extra. Out of stock Beams and Channels are sold at 2.50c. to 2.75c.

Bars.—Both Iron and Steel Bars are in fair demand, but no disposition is yet manifested to place contracts for any considerable period. Buyers are only covering their immediate requirements. Prices range from 1.64½c. to 1.74½c., tidewater, according to deliveries and specifications.

Plates.—The local demand continues light, and no indication is yet seen of an improvement. The Eastern Plate mills, however, are still well supplied with orders and are showing no anxiety regarding new business. Quotations are

firmly maintained, as follows, at tidewater: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 2.14½c. to 2.24½c.; Fire Box Plates, 2.24½c. to 2.60c., according to specifications.

Cast Iron Pipe.—No large lettings are in sight in this immediate vicinity, apart from the Brooklyn inquiry for 4000 tons, on which bids are to be opened to-day. Manufacturers report a continued influx of good orders for practically all sizes. Quite a number of inquiries are in the market from abroad, but few manufacturers are in condition to consider export business. An important tonnage is wanted for New Zealand. Carload lots of 6-inch, are quoted at \$30.50 per net ton, at tidewater.

The Department of Water Supply, Gas and Electricity of the City of New York will open bids May 23 for furnishing 45,000 lineal feet of 72-inch Riveted Pipe, to be used in laying a line from Brooklyn to Valley Stream, L. I.; also 2000 tons of Cast Iron Pipe of diameter to be stated later, with 300 tons of Special Castings, 60,000 lbs. of Cast Iron Stopcock Boxes, Cover Plates, &c.; 4300 feet of 48-inch, 120 feet of 30-inch, 1200 feet of 12-inch and 120 feet of 8-inch Cast Iron Pipe, and 250,000 lbs. of Steel reinforcement for concrete work.

Old Material.—In some lines the demand is exceedingly lively. Cast Scrap, Stove Plate, Cast Borings, Wrought Turnings and Wrought Pipe are especially active. A very great deal of Cast Scrap is now going to New England, shipments being made from points as remote as eastern Pennsylvania. Dealers say they have seldom seen such a demand for Cast Scrap, and their yards are practically bare of this class of material. Car Wheels are also quite strong with an excellent demand. Steel Scrap consumers would take considerable tonnage if they were able to secure some concession from present prices, but holders are firm in their views and are not disposed to meet the wishes of buyers as they are looking for a better demand as the spring advances. Rolling mills are buying the cheaper grades of Wrought Scrap on which prices are stronger. Railroad companies are offering considerably less than usual with them, and in general the stocks of Old Material in the hands of dealers are not plentiful. One feature of the market worthy of note is that when a buyer desires any considerable tonnage he is more inclined to meet the views of sellers than if he is purchasing a small quantity. Relaying Rails are in very strong demand. A particularly heavy inquiry is noted for 60-lb. Relaying Rails, which are very scarce and command somewhat higher prices than other sections. Approximate prices per gross ton for New York and vicinity are as follows:

Old Iron Rails.....	\$20.50 to \$21.50
Relaying Rails.....	25.50 to 26.00
Old Steel Rails, rerolling lengths.....	16.50 to 17.50
Old Steel Rails, short pieces.....	15.50 to 16.00
Heavy Melting Steel Scrap.....	15.50 to 16.00
Standard Hammered Iron Car Axles.....	25.00 to 26.00
Old Steel Car Axles.....	20.00 to 21.00
No. 1 Railroad Wrought.....	19.00 to 20.00
Iron Track Scrap.....	16.50 to 17.50
No. 1 Yard Wrought, long.....	17.50 to 18.00
No. 1 Yard Wrought, short.....	15.50 to 16.00
Wrought Pipe.....	14.00 to 14.50
Light Iron.....	10.00 to 10.50
Cast Borings.....	9.00 to 9.50
Wrought Turnings.....	12.50 to 13.50
Old Car Wheels.....	17.00 to 18.00
No. 1 Machinery Cast.....	15.50 to 16.00
Stove Plate.....	11.50 to 12.00
Grate Bars.....	10.50 to 11.00
Malleable Cast.....	16.50 to 17.50

The Edward Corning Company, builder, has removed its offices to Rooms 304 and 305, Woodbridge Building, 100 William street, New York.

E. B. Blandy, Eastern manager of sales for the Tennessee Coal, Iron & Railroad Company, has been appointed also to a similar position with the Republic Iron & Steel Company, with headquarters for both in the Trinity Building, 111 Broadway, New York. The New York offices of the company other than sales will be removed to Birmingham, Ala., in the coming week. They have been for some time in the Hanover Bank Building, 5 Nassau street. The directors' room hereafter will be at the Republic Iron & Steel Company offices, Trinity Building.

Metal Market.

NEW YORK, May 2, 1906.

Pig Tin.—The intrinsic strength of the market was well shown by both the statistics which were issued Tuesday and the steadily advancing high prices which carried spot Tin, New York City delivery, to 40c. to-day. The sales during the latter part of last week and the first of this were in good volume, consumers taking their usual quantities. The high prices do not seem to have curtailed consumption at all in this country, but there is a slight decrease in Europe. In fact, American consumption as increased more than makes up for the smaller sales abroad. The London market is very strong, closing to-day at £184 5s. for spot and £178 5s. for futures. This backwardation of £6 will undoubtedly result in London holders sending less metal to this country; at the same time the shipments from the Straits will likely be small, as there are less than 1000 tons now on the way here by direct steamer. This will undoubtedly result in a short-

age of supplies in this country and advancing quotations as compared with London, Tin now being sold in this country below London parity. The movement of Tin, as shown by the statistics gathered by C. Mayer, secretary of the New York Metal Exchange, is favorable to holders of the metal. The stocks in the United States, excluding Pacific ports, aggregate 787 tons, as against 694 tons last month. The deliveries into consumption were large, amounting to 3850 tons. The total deliveries for the first four months of this year show an increase of 1200 tons compared with the same period last year. The total visible supply for Europe and the United States on April 30 was 11,104 tons, against 11,848 tons on March 31 and 13,063 tons a year ago.

Copper.—Business is fair, but the activity noted two weeks ago has subsided to some extent. At the same time quotations are slightly firmer for some grades. For round lots of Lake, 18.62½c. to 18.75c. are quoted; Electrolytic, 18.25c. to 18.50c.; Casting Grades, 18.25c. to 18.50c. In some quarters Electrolytic is quoted ¼c. per lb. above these figures. The London market shows a sharp decline since last week, and rules to-day at £83 10s. for spot, £82 for futures, with Best Select held at £88 15s. This is undoubtedly due to the fact that the shorts have covered, and the same speculative interests which were responsible for the advance are now bringing about the decline. There has been a heavy demand for Wire, particularly the larger sizes. The imports of Copper from all sources for the first three months of this year aggregate 25,740 tons, against 21,645 tons during the corresponding period last year. The exports of domestic Copper from Atlantic ports for April were 14,778 tons, the total exports since January 1 aggregating 62,319 tons, as against 83,947 tons during the corresponding period last year.

Pig Lead.—The market is much firmer, spot stocks being held in New York at 5.60c. to 5.70c. The St. Louis market is also firmer at 5.60c. to 5.62½c. The American Smelting & Refining Company continues to quote shipment Lead in 50-ton lots at 5.50c. The demand is excellent and business has been very good. Little relief can be expected from the European market, as Soft Spanish Lead is now held at £16 in London. The price of Lead Ores has advanced 50c. a ton during the last week.

Spelter.—The market is very quiet, spot stocks being held in New York at 6.05c. to 6.15c. The same condition of affairs prevails in St. Louis, where the metal is held at 5.95c. to 5.97½c. In London prices are practically unchanged at £26 10s.

Antimony.—Another advance has been recorded, and it would not be surprising if the holders of the metal were able to force prices to a still higher level. At present Cookson's and Hallett's are held at 22c. to 23c.; other brands at 21½c. to 22½c.

Quicksilver.—The market is unchanged from last week, flasks of 75 lbs. in 100-flask lots selling at \$41. In London Rothschild's price is £7 5s.

Aluminum.—As far as immediate delivery is concerned there is really no market. The principal producer is unable to supply stocks for prompt shipment, although it is stated that the situation is growing better. When the situation will actually be relieved so that prompt shipments are available is not known. No. 1 Ingots are nominally quoted at 35c.; No. 2 at 37c.

Tin Plates.—There is a better demand for Coke Plates and also Terne Plates, both in New York and at the mills. For 100-lb. IC Coke Plates, f.o.b. New York, \$3.79 is quoted; f.o.b. Pittsburgh, \$3.60.

Old Metals.—There is a better demand for Scrap Copper, Old Brass, and, in fact, all Old Metals. Dealers' stocks are lower, and for round lots they are selling at the following higher quotations:

	Cents.
Copper, Heavy Cut and Crucible.....	18.00 to 18.25
Copper, Heavy and Wire.....	17.50 to 18.00
Copper, Light and Bottoms.....	15.75 to 16.25
Brass, Heavy.....	12.50 to 12.75
Brass, Light.....	10.50 to 10.75
Heavy Machine Composition.....	16.50 to 16.75
Clean Brass Turnings.....	10.50 to 11.00
Composition Turnings.....	13.50 to 13.75
Aluminum Scrap.....	26.00 to 28.00
Lead, Heavy.....	5.00 to 5.35
Tea Lead.....	4.85 to 4.90
Zinc Scrap.....	4.90 to 5.10

We are indebted to Aron Hirsch & Sohn of Halberstadt, Germany, represented in this country by L. Vogelstein & Co., 90-96 Wall street, for a copy of their German annual statistical review of the Copper industry. We understand that an English translation of this valuable document will soon be forthcoming.

A record tonnage for air furnace melting on charcoal iron castings was made by the Philadelphia Roll & Machine Company, Philadelphia, Pa., last week, when with three air furnaces 17 heats were run, each furnace, with one exception, running three heats per day, melting in the aggregate 340,000 pounds of iron.

Iron and Industrial Stocks.

NEW YORK, May 2, 1906.

The week has been one of alternations of strength and weakness. Very heavy liquidation in all kinds of securities set in on Friday and continued Saturday. Monday witnessed a decided improvement in prices, which continued until about noon on Tuesday, when the market again declined heavily, taking prices back to where they had been on Saturday. The extreme range of prices from Thursday morning to Tuesday afternoon was as follows on the most active stocks: Can. preferred 59½ to 62; Car & Foundry common 37½ to 41½; Locomotive common 58 to 64½; Steel Foundries preferred 42½ to 44½; Colorado Fuel 43¼ to 55½; Pressed Steel common 44½ to 52½; Railway Spring common 49 to 53; Republic common 25 to 28½, preferred 94½ to 99; Sloss-Sheffield common 72 to 80; Tennessee Coal 135¼ to 144; Cast Iron Pipe common 44½ to 48½, preferred 92¼ to 94½; Steel common 38½ to 42½, preferred 104½ to 107½. On a number of these stocks still lower prices were made this morning, sales being on an enormous scale. Last transactions up to 1.30 p.m. to-day are reported at the following prices: Can. common 7½, preferred 60; Car & Foundry common 36½, preferred 99½; Locomotive common 55½, preferred 112¼; Steel Foundries 10½, preferred 41; Colorado Fuel 41½; Pressed Steel common 43¾, preferred 95, ex-dividend; Railway Spring common 44; Republic common 23¼, preferred 92; Sloss-Sheffield common 70¾; Tennessee Coal 134; United States Cast Iron Pipe common 44½, preferred 91; United States Steel common 37¾, preferred 103¾.

The plan by which the Colorado Fuel & Iron Company proposed to raise \$4,160,000 for the purchase of additional equipment for its plants has not met with the favor expected. To obtain this fresh capital the company offered to its stockholders \$2,000,000 par value of its common stock and \$4,000,000 par value 5 per cent. series B bonds of the Colorado Industrial Company held in the treasury of the Fuel & Iron Company. April 30 was the last day for subscription by the stockholders, but few subscriptions were received. The failure of the scheme to provide additional capital is laid to the unsettled condition of the stock market, the decline in which wiped out possible profit to the stockholders in subscribing to the securities offered.

Dividends.—Standard Sanitary Mfg. Company, Pittsburgh, has declared a quarterly dividend of 1¼ per cent. on the preferred stock and 1 per cent. on the common.

Pressed Steel Car Company, Pittsburgh, has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable May 23.

Pittsburgh Valve, Foundry & Construction Company has declared a quarterly dividend of 1 per cent.

The refusal of the molders' demands has resulted in the shutting down of a majority of the 160 foundries in the Chicago district. Approximately one-sixth of these foundries are affiliated with the National Founders' Association, which as yet has not outlined a policy for combating the strike. Several foundries independent of the National Association have granted the molders' demands, but it is probable that a protracted struggle at other plants will ensue. The principal demand is that beginning May 1, 1906, the minimum rate of wage for molders and core-makers under the jurisdiction of the Chicago Iron Molders' Conference Board shall be \$3.25 per day, which represents an increase of 25 cents. The standard working day is also to be nine hours, between 7.30 a.m. and 5.30 p.m., overtime to be reckoned from the recognized quitting time and to be paid for at the rate of time and one-half. Double time is to be paid for all work performed on Sundays and the principal holidays. Apprentices shall be not less than 16 nor over 21 years of age at the beginning of their apprenticeship and shall serve a term of four years. One apprentice is to be provided for each shop regardless of the number of molders and core makers employed, and not to exceed one additional apprentice to every eight journeymen thereafter.

The engineering and constructing firm of Westinghouse, Church, Kerr & Co., New York, is to be reorganized and furnished with additional capital by Kean, Van Cortlandt & Co., and John F. Wallace, formerly chief engineer of the Panama Canal, is to become its president. A banker, to be appointed by the banking firm mentioned, will be the vice-president. The firm of Westinghouse, Church, Kerr & Co. has long been connected with the Westinghouse Electric & Mfg. Company, of which it was the engineering department. George Westinghouse will remain an important stockholder.

The Mechanical Engineers' Convention.

CHATTANOOGA, TENN., May 2, 1906 (By Telegraph).—

The fifty-third meeting of the American Society of Mechanical Engineers was formally opened Tuesday evening, May 1, at 9 o'clock, in the ball room of the Masonic Temple, Chattanooga, Tenn., with an address of welcome by Mayor W. L. Frierson, who spoke appreciatively of the honor of entertaining the society, according the profession which it represents a position of first importance in the present age, and extended a very hospitable welcome to the city.

A response was made in behalf of the society by the president, Fred. W. Taylor, who said in part that it was a pleasure to assemble in so beautiful a city, and referred to the South as the new land of promise peculiarly fitted to enter the competitive field of manufacture.

Following announcements by the secretary, Prof. F. R. Hutton, concerning changes in the order of events, as set forth in the previously printed programmes, the remainder of the evening was given to an informal social gathering.

The following morning the second session was convened at the same place, the first part being devoted to business, including the reports of tellers and committees and general business. The remainder of the period was given to the presentation of the report of the Committee on Standard Proportions for Machine Screws; report of the committee co-operating on the Pennsylvania Railroad locomotive tests, and a paper entitled "Effect of a Blow," by A. W. Moseley and J. L. Bacon.

In the afternoon an excursion to Lookout Mountain afforded an opportunity of a panoramic view of the city and its historical surroundings.

The reception will be held this evening instead of Thursday, as previously planned.

The closing professional session will be held Thursday evening, and excursions Friday morning and afternoon will keep many of the visitors until Friday night.

A full list of the papers which have been and are to be presented appeared in the last issue of *The Iron Age*, and a complete report will be given in the next issue.

At the latest account the registration had reached 147 and is expected to run somewhat over 175.

Steel Production in Germany in 1905.—Referring again to the production of steel in Germany in 1905, we give below the statistics, as compiled by the Association of German Iron and Steel Manufacturers, covering the production in Germany and Luxemburg, together with a comparison with 1904. The figures are given in full, in view of an error in the statistics of German steel production, as reproduced in *The Iron Age* of April 19, 1906, page 1348:

	Acid steel.		Basic steel.		Total.
	1905.	1904.	1905.	1904.	
	Tons.	Tons.	Tons.	Tons.	Tons.
Bess. ingots...	424,196	423,742	6,203,706	5,525,429	6,627,902
O. H. ingots...	165,930	130,546	3,086,590	2,697,760	3,252,520
Castings...	65,369	56,409	120,762	96,405	186,131
Totals...	655,495	610,697	9,411,058	8,319,594	10,066,553

The total steel production in Germany in 1905 thus appears to be 10,066,553 tons, against 8,930,291 tons in 1904, an increase of 1,136,262 tons, of which 44,798 tons were acid and 1,091,464 tons basic steel. Germany's steel production in 1905 was slightly over 50 per cent. of the total produced in that year in the United States.

The Frodingham Iron & Steel Company, Limited, Frodingham, England, has taken a patent on a method of preventing the accretions of fine ores and coke dust on the bosh walls of blast furnaces. It provides for placing tuyeres at suitable places and at proper angles so as to remove such accretions or prevent their formation.

March Iron and Steel Exports and Imports.

According to the March report of the Bureau of Statistics of the Department of Commerce and Labor, both exports and imports of iron and steel increased heavily as compared with February. The total value of exports of iron and steel of all kinds, excepting iron ore, was \$14,792,214 in March, against \$12,747,343 in February. Taking the commodities for which quantities are given, the exports reached 138,679 gross tons in March, as compared with 97,719 tons in February. It would be necessary to go back a great many months to find a total as large as the March total. The following table shows the exports of such commodities for the month of March, this year and last year, as well as for the nine months ending with March:

Exports of Iron and Steel.

Commodities.	March.		Nine months.	
	1906.	1905.	1906.	1905.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	8,647	3,281	39,930	48,665
Scrap	284	443	7,451	17,369
Bar iron.....	4,813	2,837	26,859	23,766
Wire rods.....	994	743	4,610	13,143
Steel bars.....	2,659	2,695	15,310	19,253
Billets, ingots, blooms	28,421	24,124	212,886	189,742
Hoop, band, scroll...	65	150	4,042	2,543
Iron rails.....	.....	44	.....	75
Steel rails.....	35,431	24,885	257,179	339,831
Iron sheets and plates	809	358	7,231	3,449
Steel sheets and plates	6,953	7,590	50,879	48,577
Tin plates andterne plates	1,352	298	5,208	5,442
Structural iron and steel	10,130	5,194	67,447	51,936
Wire	14,924	12,448	114,260	86,513
Cut nails.....	684	455	5,343	5,862
Wire nails.....	5,581	3,691	31,718	26,513
All other nails, including tacks.....	163	619	2,775	2,832
Pipes and fittings*	16,769	.....	113,415	.....
Totals	138,679	89,855	966,543	885,521

* Quantity not stated prior to July 1, 1905.

The above details as compared with those for February show increases in nearly every item, which are particularly large in steel rails, structural iron and steel, pipes and billets.

The total value of the imports of iron and steel of all kinds, excepting iron ore, was \$3,028,592 in March, as compared with \$1,875,173 in February. Taking the commodities for which quantities are given, the total imports for March were 50,167 gross tons, as compared with 28,407 tons in February. The following table shows the imports of such commodities for the month of March, this year and last year, as well as for the nine months ending with March:

Imports of Iron and Steel.

Commodities.	March.		Nine months.	
	1906.	1905.	1906.	1905.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	32,282	14,388	197,301	69,514
Scrap	733	1,452	22,721	8,856
Bar iron.....	1,357	1,414	31,070	17,644
Rails	5	361	8,439	8,357
Hoop, band and scroll .....	.....	.....	7,722	1,584
Billets, slabs, bars, &c., steel in forms, n.e.s.	1,756	682	14,466	7,048
Sheets and plates...	239	306	2,012	1,661
Tin plates andterne plates	6,004	5,517	40,895	54,403
Wire rods.....	1,340	910	13,814	10,728
Wire, and articles made from.....	441	516	2,895	2,834
Structural iron and steel	5,962	269	26,217	2,140
Chains	32	10	211	210
Anvils	16	4	153	103
Totals	50,167	25,829	367,916	185,082

The heaviest increase in imports as compared with February was in pig iron, while tin plates andterne plates almost trebled, and structural iron and steel likewise showed an exceptionally heavy gain. Iron ore imports in March were 94,763 gross tons, against 84,401 tons in February.

The total value of exports of all kinds of iron and steel and manufactures thereof, not including ore, in the nine

months ending with March was \$116,282,796, against \$97,711,595 in the corresponding period of the previous year, while the total values of the same class of imports were respectively \$20,749,674 and \$16,273,796.

Earthquake Damage to the Union Iron Works.—

E. M. McIlvain, president of the Bethlehem Steel Corporation, has gone to San Francisco to take account of the damage done the Union Iron Works plant and to facilitate its repair. Late reports say that at the machine shops the roof of the main building fell in, and there was some damage to the masonry, which will require its strengthening with girders. Some of the machinery will require lining up, but the damage in this respect is slight. The cruiser Columbia, which was on the dry dock, was pitched forward by the earthquake, tumbling on the supporting blocks, and fell on the platform, breaking the main girders. The hydraulic cylinders and the foundations of the dry dock are intact, but the platform is a total wreck. The steamer City of Puebla suffered considerable damage. The steel shear legs, about 100 feet high and with a capacity of 80 tons, fell on the vessel, which was off the pier, causing her to sink, a number of plates being stove in under the water line. She has since been raised and goes to the Hunter's Point dry dock for repairs. The management at the Union Iron Works has succeeded well in organizing again its working force, after its reduction by the destruction of homes, and now has 2500 men at work, as against 3000 to 3500 under ordinary conditions.

Chicago bridge and structural iron workers to the number of approximately 1000 went on strike May 2, having refused in a final conference the previous evening every proposition of the employing contractors for a compromise and arbitration. The action of the workers has precipitated a general stoppage of much construction work. The union insisted on \$5 a day for eight hours' work, equivalent to 62½ cents an hour. The Iron League of contractors offered \$4.60 a day for five to six months and \$4.80 for the rest of the year. While it is stated that a few of the contractors have conceded the demands of the iron workers, the majority of the employers are standing firm.

Representative metal working firms in New Jersey have united with those in New York City, heretofore constituting the New York Metal Trades Association, to form the New York and New Jersey Branch of the National Metal Trades Association. The jurisdiction of this branch, which will be under the management of Henry C. Hunter as deputy commissioner of the national organization, will be Greater New York and that portion of New Jersey north of Trenton. The new branch will have at the start 162 members, employing about 15,000 men. It is understood that the organization will be a unit against the eight-hour day, for which there is now an agitation among union machinists.

The first serious collision in the anthracite coal region since mining was suspended on April 1 occurred at Mount Carmel, Pa., on April 30, between a mob of idle miners and a force of the State constabulary. It resulted in the injuring of 20 miners, three probably fatally. The miners stoned the policemen and the latter charged the mob, finally dispersing it. Later the stoning was renewed and the constabulary fired into the mob. Latest information from Scranton was that at the meeting of the Scale Committee on Wednesday it was expected the report to the convention would be prepared, and it was considered certain that the convention would declare a strike.

A general strike of 1800 blacksmiths and helpers in Chicago and vicinity has been ordered to enforce a new wage scale. They receive from 33 1-3 cents an hour to 40 and want from 37½ to 45 cents. Helpers get 25 to 27½ cents an hour and demand 27 to 29 cents. Strikes were called in every plant where the new scales were refused. About 20 employers agreed to the increase.

The Machinery Trade.

NEW YORK, May 2, 1906.

While with a majority of machine tool houses business kept up to a high water mark, a slight lull in the buying movement was experienced in some quarters during the past week. It is believed by the latter that the small decrease in orders is of no significance, as the general condition of the market continues extremely firm, and they fully expect an immediate resumption of heavy buying. All hold to this view, which is exceedingly probable, as there are many large inquiries before the trade and evidences of more in the immediate future are forecasted by the purchase of power equipment by the railroads. Both the Big Four and Seaboard Air Line railroads have recently placed orders for air compressors, the former for its new Indianapolis shops. It is said in the trade that the railroads as a rule purchase the power equipment first and then prepare their lists of machine tools. Lists of tools are expected shortly from both of these railroads. Further assurance is given that orders will soon be placed for the \$100,000 list of tools for the proposed new automobile fittings plant.

There has been an increased demand for cranes of all sizes in the New York market during the last year, and plans of modern plants show that hoists and traveling cranes are coming into use more and more. Manufacturers seem to realize that even in lifting parts of machinery that require the strength of but two men the use of a crane is both a labor and time saver, consequently those who specialize in making cranes are kept pretty busy these days. One well-known firm has received through its New York office during the last few months inquiries for more than \$200,000 worth of cranes of various descriptions, and of this business it is said there is \$100,000 worth which has not been settled upon. Cranes are being used in lines where they have never been put in operation before. The demand for cranes of small type, and especially those that can be wheeled around the shop at will, is so heavy that most of the manufacturers do not promise delivery under three or four months.

The New York branches of two important German machinery houses that make a business of importing machinery equipment of American manufacture into Germany and other European countries, have been watching the progress of American machinery men in Japan with apparent interest, as within the last few weeks both firms have opened offices in Japan and prepared to go into active competition for business. The Germans have attached their Japanese branches to their New York houses in a way, and they will probably prove a factor in the keen competition for Japanese business that is now going on among the machinery men represented there.

At the convention of the National Machine Tool Builders' Association, held in Atlantic City, N. J., Tuesday and Wednesday, further advances on prices of some classes of machine tools were made. Prices on planers were advanced 5 per cent., and a 5 per cent. advance was also announced on the prices of shapers. These advances are in addition to those made some time ago. An important element in the advances is that they are based on resale prices, from which discount to the jobber will be made. A more detailed report of the convention appears in another column of this issue.

The Air Brake Association of America, which is composed of practical men interested in the construction and use of air brakes, will hold its annual convention on June 5, 6 and 7, at Montreal, Canada. The association will make its headquarters at the Windsor Hotel, and there will be papers and discussions on subjects calculated to interest those in the use of air brakes. The association has an office at 111 Broadway, New York.

It is understood that the International Steam Pump Company, New York, will increase its capital stock \$8,000,000 at a special meeting of the stockholders, to be held May 8, and that the proceeds from the sale of the additional stock are to be used to acquire the Power & Mining Machinery Company, New York, which is controlled by Benjamin Guggenheim. The acquisition of this company will give the International Steam Pump Company a large and completely equipped plant at Cudahy, Wis., for the manufacture of mining machinery, gas engines and gas producers. These products will be important additions to those of the International Company, which already does an extensive business with mining companies, and will place it in a position to supply a full line of mine equipment.

Two Railroad Machine Tool Lists.

The trade is now busy bidding on the large list of machine tools sent out by the Southern Railroad last week, whose purchasing agent is located in Washington, D. C. The list covers close to 100 tools, which will easily aggregate in

value \$75,000. A great deal of the machinery is of the heavier class, and most of it is to be motor driven. The requirements include several 84-inch heavy driving wheel lathes, 90-inch 400-ton driving wheel lathe and about 20 engine lathes. The engine lathes range from 16 x 54 inch to 42 x 144 inch. In addition seven good sized turret lathes are wanted, besides five planers ranging from 36 x 36 inch x 10 foot to 60 x 60 inch x 30 foot, and a 36 rotary planer with 14-foot bed. The list also covers five or six traveling cranes of from 10 to 65 tons capacity, some with 5-ton auxiliary hoists. The other machines for which the company is asking bids include a 250-pound steam hammer, 5½-foot radial drill, four-spindle stay bolt machine, locomotive frame slotting machine, 24-inch stroke; locomotive rod boring machine, locomotive frame drilling machine, about seven vertical boring mills, ranging from 38 to 96 inches; one 30-inch turret packing boring mill, three 26-inch turret vertical boring mills, three 30 x 30 inch x 14 foot horizontal boring mills, three 12 x 26 inch slotting machines, one 24-inch drill slotter, one locomotive keyseating machine, six 24-inch shapers, one 60-inch horizontal boring machine, two 6-foot radial drills, six large drill presses, one 15-inch grinder, one eight-spindle bar drill, two 16-inch drill presses, several grinders, one 36-inch cold metal saw, one taper boring machine, four bolt cutters, punch and shear with 18-inch throat, plate planing machine, power bending rolls, rotary cutting shear, grinders, and a number of smaller tools. It is not stated for what shops this machinery is required, but it is understood that some of it will go to the Lonsdale shops, where new buildings are in course of construction.

Inquiries have been extended by the purchasing agent of the Pennsylvania Railroad for prices upon the necessary heating apparatus for hot water heating, for a proposed new lathe and machine shop for Altoona machine shops. If the proposed building becomes an accomplished fact a list of tools and machinery will doubtless be wanted, and these also will come through the purchasing agent. The following list of tools is the subject of inquiry just now: One No. 4 self feed rip saw and table and one No. 4 improved heavy automatic cut off saw, with 36-inch saw blade; machines to be belt driven and propositions to give full information in regard to the machines proposed; one four-spindle vertical car boring machine with 12-foot power and hand operated table, belt driven; one 1½-inch four-spindle bolt cutter, belt driven, with countershaft, pump, wrenches, &c., complete; one vertical spindle milling machine for machine tool work, the machine to have approximately the following general range and adjustments: Table, 18 x 50 inch, finished with T slots, having an automatic longitudinal feed of 50 inches, an automatic transverse feed of 12 inches, an automatic vertical feed to spindle of 12 inches, end of spindle to top of table not less than 24 inches, machine to be fitted with a circular milling attachment, having a table not less than 20 inches in diameter, table to be fed both automatically and by hand. Two propositions are asked, one machine to be belt driven and the other machine motor driven, with a 220-volt direct current motor.

It is highly probable that before long the Delaware, Lackawanna & Western Railroad will come into the market for equipment for the locomotive shop in course of construction at Kingsland, N. J., where the company has established a large machine shop and other buildings comprising a railway repair and car building plant. The locomotive shop, which is well along toward completion, is 106 x 606 feet, and while no additional power will be required to operate the shop, as the general power plant will be ample to take care of it, it is said that the company will need considerable new equipment. All the available machinery in the small locomotive shop now at Kingsland will be moved into the new building, but that will hardly suffice for the needs of the new plant, which will be put in operation as soon as possible. Those in the trade who follow such matters declare that it will not be long before a list covering the needs of the shop will come before the trade.

Large Paper Plant to Be Erected.

The Great Northern Paper Company, with New York offices at 49 Wall street, will come into the market shortly for a large amount of equipment for a new mill to be erected near Millinocket, Maine. The new mill is to be located 6 miles from an existing plant owned by the company and it will be one of the largest in the country. It is expected that \$2,000,000 will be expended on the plant and its equipment, and it will have a capacity of turning out 150 tons of finished paper a day. The company will need a large amount of power equipment as well as paper machines, bleaching machines, beating engines, collanders, pumps, refining engines, washing machines and the like. The company makes news paper at its present plant, and will perhaps turn out the same class of paper at the new plant. The cost of the new mill will be paid out of earnings without increasing the company's capital stock, which is \$5,000,000. Plans for the new plant are being prepared under the direction of Garret Schenck, who has offices at 440 Old South street, Boston, Mass., and he will probably have direct charge of equipping the plant.

A fair sized lot of machine tools is required by the Standard Roller Bearing Company, Philadelphia, Pa., for the equipment of its new four-story building, 150 x 200 feet. The company is now in the market for the following machine tools, either new or second-hand: 15 Brown & Sharpe universal grinders, 4 rivet grinders, 6 Brown & Sharpe plain grinders, 4 Potter & Johnson automatics, 16 18-inch lathes, 8 16-inch lathes, 6 Cincinnati milling machines, 14 upright drills, 16 to 24 inch; 2 radial drills, 2 disk grinders, 2 steam hammers, 1 3000-pound drop hammer, 1 2000-pound drop hammer, 1 1200-pound drop hammer, 3 trimming presses, 4 large gas tempering furnaces.

There have been some inquiries in the market for equipment for the drop forging plant of the Bethlehem Steel Company, and it is thought that shortly the list of requirements for that department will be enlarged, as it is said that the company proposes to make further additions to its drop forging plant, which is used for making automobile fittings. The department has proved very successful and it is crowded with work, and when it was established it was given out that the plans called for a larger plant than was installed. Scattered inquiries placed by the company indicate that plans are being made for going ahead with the improvements, and this will mean the purchase of much additional machinery.

The T. H. Symington Company, Baltimore, Md., is making important improvements to its plant at Corning, N. Y., but it is not yet definitely decided to what extent the improvements will be carried. It is understood that there are to be three new buildings, 60 x 180 feet, 60 x 112 feet and 60 x 80 feet, respectively, which will greatly increase the capacity of the plant. The recent fire at the plant did but little damage, and the worst loss in the machinery covered a number of motors aggregating 150 horse-power, which will have to be replaced by new motors to be furnished by the Westinghouse Electric & Mfg. Company. The works are now in full operation and the output of journal boxes was only interrupted a few days by the fire.

The Casey-Hedges Company, Chattanooga, Tenn., recently incorporated to take over the plants of the Casey & Hedges Mfg. Company and the Chattanooga Pipe & Foundry Company, will construct four new buildings, to take care of its boiler shop work. These buildings will be 90 x 336 feet, 50 x 135 feet, 80 x 225 feet and 60 x 200 feet. The company will require new rolls, punches, steam hammers and hydraulic riveters. A 22 x 36 inch Corliss engine has been purchased from Filer & Stowell, Milwaukee, which will be direct connected to a 300-kw. Bullock generator.

Traylor Company's Plant.

The Traylor Engineering Company, 118 Liberty street, New York, which has been sending inquiries out to machinery men in the metropolitan district for several months past, is completing a large plant at Allentown, Pa., for the Traylor Mfg. & Construction Company, which, it is said, will be the only large plant in the East designed for the manufacture of smelting and mining machinery. The company is preparing to assume contracts for the erecting and equipping of complete plants. The plant at Allentown is modern in every respect and the machinery equipment will be specially complete. A large amount of machinery has already been installed, and the company is now placing some scattered orders for machinery for the foundry and machine shop and other parts of the plant. There are still a couple of cranes to be bought. The Traylor Mfg. & Construction Company formerly had a plant at Belleville, N. J., which was by no means as large as the plant now being built. The new plant was begun about January 1 and now nearly all the buildings are up. The plant includes a foundry, 100 x 285 feet, in which will be installed a 15-ton crane and a 6-ton crane; machine shop, 100 x 205 feet, the crane equipment of which will be similar to that of the foundry; chipping room about 20 x 100 feet; pattern and carpenter shop about 50 x 200 feet, and an L-shaped machine shop, in addition to the other machine shop which is in the main building. The detached machine shop is to be about 50 x 280 feet and an L about 50 x 75 feet. There is a boiler shop detached from the main building, 88 x 200 feet, and a power house. The power plant consists of two 200 horse-power water tube boilers, an air compressor and two Corliss engines, direct connected to two 100-kw. generators. The entire plant is to be operated electrically and all the hoists will be electrically operated, even to those in the large erecting yard, which will adjoin the main building. The total amount of floor space in the new works will be about 100,100 square feet. The Traylor Engineering Company, which is equipping the plant, is affiliated with the Traylor Mfg. & Construction Company, and the officers of the latter corporation are: Samuel W. Traylor, president and treasurer; Bruce W. Traylor, vice-president; Frank W. Hopkins, assistant treasurer, and P. Edwin Van Saun, secretary. All the officers are engineers and have had long experience in the manufacture of the class of machinery that the company undertakes to build. The company has also prepared to manufacture a line of cement making machinery, particularly crushers and the like.

The jewelry firm of Schaible & Crane, 44 Hill street, Newark, N. J., is having a four-story addition made to its

plant, which will consist of a building 35 x 123 feet and a wing 20 x 60 feet. The company will come into the market for power equipment which will consist of a 125 horse-power Corliss engine and a 75-kw. generator. There is other machinery equipment to be purchased, it is understood, for equipping the manufacturing floors.

Paul Faulhaber is having erected at 34 East Ninety-fifth street, New York, an addition to his wagon building plant which will be 25 x 100 feet, three stories. He will shortly come into the market for five electric motors and perhaps other equipment. Mr. Faulhaber is attending to the machinery details.

The Case Mfg. Company has received through its New York office, 35 Liberty street, an order for a 15-ton three-motor electric traveling crane of 47 feet span for the new shops of the Traylor Engineering & Construction Company, 118 Liberty street. The Case Mfg. Company recently furnished a 25-ton crane of 75 feet span, with five auxiliary hoists, for the same parties for outdoor service.

The Dominion Steel Car Company, Montreal, Canada, closed out most of the contracts last week for the machinery equipment for its new plant, and a number of New York machinery men were in Montreal and carried away with them orders for considerable business. American manufacturers got the major portion of business. About all the machine tool equipment has been closed for, but it is understood that the power contracts are still to be let. The equipment included considerable punching, shearing and riveting machinery and several orders for heavy cranes. J. A. Lamont, who has his headquarters at Montreal, is in charge of the purchasing.

The Railway Steel Spring Company, Latrobe, Pa., which has had a considerable number of inquiries in the market of late for equipment for the additions being made at Latrobe, Pa., has been closing out some orders. A number of machine tool men in the metropolitan district have been given contracts, and it is understood that all the power equipment has been bought.

Some Large Power Projects.

Official announcement has been made by President Thomas McCarter of the Public Service Corporation of New Jersey, that the company has transferred to the Pennsylvania Railroad its terminal site on Park place, Newark, N. J., and has given up its scheme to enter New York with a high speed line calculated to deliver passengers from Newark to Manhattan in 15 minutes. This means that the Pennsylvania Railroad and the McAdoo tunnel interests will co-operate in the construction of a high speed electric line from Newark and Hudson County to several projected terminals in Manhattan. A Public Service official declared last week to a representative of *The Iron Age* that the Public Service Corporation has made no agreement toward furnishing power for the proposed high speed line of the Pennsylvania Railroad, and consequently that company will furnish its own power. This will mean the construction of a large power house somewhere between Newark and New York, and as it has been declared that at the latest the line will be completed within two years, it will be but a short time before dealers here will be given a chance to bid on equipment. It is highly probable that the railroad will extend its high speed lines to other outlying suburbs in order to compete with nearby roads that have made preparations to adopt that system of transportation. Under the agreement entered into by the Public Service Corporation that company will operate its surface systems in Essex and Hudson counties, so as to facilitate the transfer of passengers to the stations of the high speed lines. It has been announced that it will not be necessary to build the terminal for the high speed line laid out by the Public Service Corporation's engineers, but the Pennsylvania Railroad will construct a large transfer station at Harrison, and it is said that the motive power will be changed from steam to electricity at that point. It is still an open question, however, as to what the Pennsylvania Railroad will do with the terminal at Park place, Newark, as well as the right of way, which was purchased by the Public Service Corporation when it laid out its plan of entering New York. It is thought, however, that the Pennsylvania Railroad plans include the construction of a terminal on the purchased property, as it is located in the heart of the business section of that city and will afford an advantageous inlet for the company's passenger traffic, which is particularly heavy at the Market street station of the Pennsylvania Railroad. Whatever power plans will develop in that respect the trade can rest assured that the scheme will mean large expenditures for machinery, and if the company carries out its announced policy of constructing the line within two years the inquiries can be expected very shortly. It was thought by some that power would be derived for the high speed line from the big power house recently built by the Public Service Corporation on the Hackensack meadows, but from an authoritative source from that company it was learned that all of the power development there can be easily used and the company is considering the advisability of constructing an addition to the plant in order to develop more power, as the power house is now running to its full capacity. When the original plans for that plant

were devised provision was made for making additions, and it was announced that the section which was built last year comprised only one-fourth of what the plant would be eventually.

The recently formed engineering firm of Viel, Cooper & Blackwell, with offices at 49 Wall street, New York, has undertaken the development and construction of a large canal, which will extend from the Niagara River at a point near La Salle to a point at the gorge near the Devil's Hole, and the company will develop 200,000 electric horse-power, of which it is said 30,000 horse-power will be used for manufacturing purposes. It is expected that between \$20,000,000 and \$30,000,000 will be expended on the canal and the power plant equipment, and the canal will be of sufficient depth and width to accommodate lake vessels. The carrying out of this project will mean large expenditures for equipment, as it is not thought the company has purchased anything in that line as yet. The fact that the chief offices of the engineering firm are located in New York gives good assurance that much of the equipment will be bought here. As yet it is understood the scheme is in its preliminary stages and no inquiries have been sent out for equipment. Just what manufacturing interests are to be developed those interested will not announce as yet, but they declare that those facts will be made public later on. In addition to the direct scheme there will probably be considerable other business from the new manufacturing industries that are to be begun in connection with the plant, and as it has been announced that the development will proceed as rapidly as possible, it is safe to say before fall there will be some substantial inquiries from that source.

A contract has been awarded to J. G. White & Co., 49 Exchange place, New York, by the Potomac Electric Power Company, Washington, D. C., for the erection and equipment of a new power house designed to furnish light and power in the capital city. The power house will cost about \$1,500,000 and it will contain two 2000 and one 5000-kw. turbo generators, with boilers and superheaters. Provisions will be made for adding 5000-kw. units later on, making an ultimate capacity of 19,000 kw. All the turbines will generate 25-cycle three-phase current at 66,000 volts for direct distribution to the substations. Mechanical coal and ash handling machinery will be installed and all the auxiliary machinery, with the exception, perhaps, of the coal handling apparatus, will be steam driven. Controlling apparatus will be contained entirely in the switch house adjoining the main structure. It is understood that the coal and ash handling machinery has not been purchased as yet and there is some auxiliary equipment to be bought. The details are being looked after at the New York office of J. G. White & Co.

Plans are now being prepared by R. P. Bolton, 527 Fifth avenue, New York, for a terminal station and power house to be constructed for the New York Central & Hudson River Railroad at Forty-second street and Park avenue, New York. None of the equipment for the power plant has been purchased as yet, and beyond the fact that there will be a large plant no details have been made public. It is thought that the plans will be completed about May 15, and bids will then be asked. The equipment will include coal and ash handling machinery, as well as the usual apparatus required in a power house.

The Hooven, Owens, Rentschler Company has, through its New York office at 39 Cortlandt street, received the following orders within the last few weeks: Rochester Sewer Pipe Company, Rochester, N. Y., 300 horse-power engine; Raritan River Clay Company, Perth Amboy, N. J., 500 horse-power; Floyd-Wells Company, Reading, Pa., 200 horse-power; Heubner & Sons, Newark, N. J., 100 horse-power; A. W. Hopeman, Rochester, N. Y., 150 horse-power; Paducah Light & Power Company, Paducah, Ky., 750 horse-power engine, direct connected to 500-kw. generator; Edison Electric Illuminating Company, Sunbury, Pa., 450 horse-power engine, direct connected to a 300-kw. generator; Pawnee Cereal Company, Cedar Rapids, Iowa, 850 horse-power engine, direct connected to 550-kw. generator; Railway Steel Spring Company, Latrobe, Pa., 750 horse-power engine, direct connected to 500-kw. generator.

Business Changes.

The engineering and purchasing departments of the Erie Railroad, together with the other offices of the company, have been moved from Cortlandt street to 11 Broadway.

Catalogues Wanted.—Paul S. Carter, purchasing agent in the United States for the Government of the Philippine Islands, War Department, Whitehall Building, New York, desires catalogues and price sheets in triplicate of hub boring machines and spoke tenoning machines.

C. W. Marwedel, 58-60 First street, San Francisco, Cal., dealer in machine shop supplies and tools, was burned out in the great conflagration. Before the fire was out he secured material for putting up a temporary sheet iron structure until permanent quarters can be secured, and expects to be housed and ready for business with a stock of tools on hand inside of 30 days. As all catalogue files were destroyed Mr. Marwedel desires to receive catalogues, price sheets and quotations on machinists' tools and supplies, metal working machinery, &c. His present address is 2472 Union street.

Chicago Machinery Market.

CHICAGO, ILL., May 1, 1906.

The inability of machine tool manufacturers to make early deliveries to some extent is interfering with the purchase of new equipment, and stocks in the hands of local dealers are almost depleted. Nor are the prospects bright for their early replenishment, as shipments on new orders now placed cannot be made in less than from four to six months. It would naturally follow that second-hand tools would be purchased freely, but at present there is a lull that cannot well be explained by dealers. The stocks generally are larger than at any time in the past six months and cover a wide range of equipment. Extensions to foundries are being made at industrial plants throughout the West and equipment, such as cranes, cupolas, &c., is moving freely.

The Duluth Brass Works, Duluth, Minn., is about to build a new plant on property recently purchased. The site consists of 175 feet on Fifth avenue, with a frontage of 50 feet on Ramsey street. A cement block structure will be erected, 50 x 125 feet. The company will require new furnaces, gate cutters, grinding machine, crushing machine, core ovens, core machine, &c.

The Charles Engine Company, Rapid City, S. D., has decided upon the establishment of a large modern plant and is seeking a location offering desirable manufacturing facilities. The company has been organized for the manufacture of a kerosene engine, of which Homer Charles is the inventor and patentee. When a site has been secured the company will be in the market for a full complement of power and machinery equipment, costing from \$50,000 to \$100,000, and including particularly boring mills, shapers, appliances for stamping and drop forging the small engine parts, &c. The engine is of the two-cycle type, having no valves nor outside working parts. Interested in the company are Homer, John and Rollen Charles, and C. I. W. Smith.

The Arcade Mfg. Company, Freeport, Ill., has well under way additions to its plant, which include a brass foundry, 50 x 80 feet, and a gray iron foundry, 65 x 200 feet. The cupola for the iron foundry is of the Colliau pattern and will be furnished by the Byram Furnace Company, Detroit, Mich. Furnaces for the brass foundry will be purchased from the J. D. Smith Foundry Supply Company, Cleveland, and the Dodge Mfg. Company, Chicago, will furnish the power transmission machinery for both buildings. With its extension the iron foundry will have a melting capacity of about 20 tons a day. It is expected to have the extension in operation within 60 days.

The Monarch Mfg. Company, Des Moines, Iowa, has filed articles of incorporation, with a capital stock of \$50,000, to manufacture ice and cold storage machinery. The incorporators are W. D. De Mont, C. J. Bristol and W. D. Sanford, all connected with the Des Moines Gas Engine & Electric Company. The new corporation is really a successor to the Des Moines Gas Engine & Electric Company, which was purchased by the above three gentlemen about the first of the year. In view of the two special lines which are to be manufactured a change in the style of the company seemed necessary, although the manufacture of the gasoline engine will be continued, and in addition a general machine shop and foundry business will be conducted.

The Carthage Superior Limestone Company, Carthage, Mo., which recently opened large quarries at that place, is already making important improvements, which include the purchase of considerable equipment. The company is still in the market for a 75-kw. or a 100-kw., 220-volt, direct current generator, belted type, and an electrical hoist with a capacity of about 40 tons, equipped so as to be operated from the derrick step. Early next year the company will purchase more gang saws, having to do seven or eight months' quarrying to provide space for them. Some of the larger equipment already purchased is as follows: Five gangs, various dimensions, purchased from the Lincoln Iron Works, Rutland, Vt.; one 40-ton belted hoist, Patch Mfg. Company, Rutland, Vt.; two sets 40-ton derrick irons, American Hoist & Derrick Company, St. Paul, Minn.; one Sullivan stone channeller, Sullivan Machinery Company, Claremont, N. H.; one Wardwell stone channeller, New Albany Mfg. Company, New Albany, Ind.; one 300 horse-power Corliss engine, Bates Machine Company, Joliet, Ill.; two 66-inch by 16-foot 125-pound boilers, Erie City Iron Works, Erie, Pa.; one feed water heater to suit above, Bates Machine Company, Joliet, Ill.; one 35-kw. direct current generator, Westinghouse Machine Company; one 30 x 24 inch Jeffrey pulverizer, Jeffrey Mfg. Company, Columbus, Ohio; one 9x15½ inch jaw crusher, Webb City Iron Works, Webb City, Mo. The plant was placed in operation about six months ago and the capital stock of the company was recently increased from \$40,000 to \$65,000 to provide for the improvements. R. M. Richter is president and general manager, Geo. S. Beimdick treasurer and C. H. Carter superintendent.

Readvertised specifications for equipment for the new Cook County Building call only for such machinery as will be used for heating purposes. Arrangements have been practically made for leasing the power from the Chicago Edison Company, which will obviate the need of purchasing gen-

erators, engines and other power units. The revised specifications call for five water tube boilers of 350 horse-power each and a separate bid on an additional 100 horse-power boiler. Proposals will be received on boilers complete with shaking grates and boilers complete with mechanical stokers or traveling grates. In addition to the boilers the specifications call for coal conveyors and ash hoists, pumps, tanks and high pressure piping, switchboard and vacuum cleaning system. Bids will be received until May 7 at the office of the Cook County Commissioners, 218 La Salle street, Chicago.

The city of Belleville, Kan., is in the market for electric light plant equipment and will receive bids until May 15 on two 75-kw. generators, one 66-inch by 16-foot boiler, two high speed engines and accessories.

The Whiting Foundry Equipment Company, Harvey, Ill., has under way a number of important additions to its plant. The extensions comprise a new pattern shop, 44 x 96 feet, and an addition, 52 x 130 feet, to the machine shop. The latter will give additional shipping facilities, permitting two tracks to cut through the shops and facilitating the loading of electric traveling cranes and equipment of heavy capacities. These improvements have been made necessary by the steadily increasing business which this company is now enjoying.

The general sales offices of the Western Brake & Electric Company, Milwaukee, Wis., are now located at 519 First National Bank Building, Chicago.

New England Machinery Market.

WORCESTER, MASS., May 1-1906.

The machine tool manufacturers have already begun to receive urgent calls from San Francisco dealers for tools with which to replace stocks destroyed by the earthquake. This is true of manufacturers everywhere, and New England houses are no exception. A few manufacturers, on the other hand, have had no word whatever from their agents and do not know where they stand as to the machinery which was carried in stock in San Francisco. The dealers there, in common with those of other centers, had no great amount of new tools in hand, the demand having depleted most lines of machinery. A few inquiries already received in New England indicate that users of machine tools in the earthquake district are rapidly formulating plans for replacing their plants.

The union molders of Boston and vicinity have made demands upon foundrymen for a flat advance of 25 cents a day. The nine-hour day is already in operation and no mention is made of minimum wage, the present figure being \$2.75. The demand is for an increase of 25 cents a day in the wages of all molders. The men have struck in seven foundries, comprising those of the B. F. Sturtevant Company, Readville; the Becker-Brainard Milling Machine Company, Hyde Park; G. H. Lincoln & Co., South Boston; Lumsden & Van Stone Company; Osgood & Wetherby, Charlestown; G. W. & F. Smith Iron Company, and the Lovewell Henrici Company, Chelsea. The foundrymen are organized.

Union molders of Nashua, N. H., have gone on strike in three of the city's foundries, those of the Flather Foundry Company, William Highton & Sons and the Co-operative Foundry Company. The union made demand on the employers for an advance of minimum wage from \$2.50 to \$2.75 a day and a reduction from a ten to a nine-hour day. The demand was refused. The employers propose to conduct their foundries on the open shop basis hereafter.

The works of the Haydenville Company, Haydenville, Mass., manufacturer of brass and iron goods for water, gas, steam, &c., has been shut down for some days because of a strike of the employees, the reason given for which being the employment of a new superintendent whom the employees claimed was too arbitrary in his methods. The works reopened April 25, when about one-quarter of the men returned to work. The members of the union of brass molders and brass finishers remained out in a body, and the company will replace them unless they return to work immediately.

Shipbuilders who are figuring on the specifications of the new battle ships South Carolina and Michigan have sent out for preliminary estimates copies of the specifications as furnished by the Navy Department relating to the equipment of the repair shops of the two vessels, which will be identical. The estimates will be used in figuring on the general contracts, in which the equipment of the shops are included. The list comprises a 28 x 48 inch extension gap lathe, 10 feet between centers; a 14-inch engine lathe, 4 feet between centers; a 15-inch shaper, 28-inch upright drill, universal milling machine, combined hand punch and shears, double emery grinder on column, portable cylinder boring machine, 16-inch sensitive drill, steel blacksmith's forge, folding type; blacksmith's forge, 42 inches square, and some small tools. Delivery of these tools will not be required for at least a year.

John Hemingway, Lynn, Mass., is to erect a new machine shop, 40 x 103 feet and one story, and will remodel

the Butman mill property recently acquired by him, consisting of a mill building, 36 x 70 feet and three stories, and a two-story warehouse, 30 feet square. Most of the necessary tools are already in use in Mr. Hemingway's present shop, but he will require a band saw, buzz planer and probably a small pony planer as additional equipment for his wood working department.

The Chandler Planer Company, Ayer, Mass., is soon to occupy the addition which will double the works and enable the company to greatly increase its output.

The Humphrey Machine Company, Keene, N. H., has secured the services of James C. Black of Orange, Mass., who will take full charge of its water wheel business. Mr. Black was with the Rodney Hunt Machine Company, Orange, for more than 20 years, and has installed such plants as Great Northern Paper Company, Millinocket, Maine, 26,000 horse-power; Columbia Water Power Company, Columbia, S. C., 11,000 horse-power; Bridge Mill Power Company, Pawtucket, R. I., 1300 horse-power. The company has also arranged to handle the well-known McCormick wheels, made by J. & W. Jolly, Holyoke, Mass., which, with the Humphrey wheels, of entirely different type, will enable it to comply with any conditions which may arise in water power development.

The Fitchburg & Leominster Street Railway Company, with offices at Fitchburg, Mass., has acquired the Nashola mill property in Ayer, Mass., with the intention of establishing a larger power station on the premises, though the immediate change from the South Fitchburg station is not projected. There is water power at the new location and ample water for condensing purposes in connection with a new steam plant.

F. S. Blanchard has been made manager of the business of the Ashcroft Mfg. Company, Bridgeport, Conn. He is a graduate of the Massachusetts Institute of Technology, Boston, and has previously been associated with the B. F. Sturtevant Company, Readville, Mass.; the Blanchard Machine Company, Boston, with which his father and brother are identified; the American Warp Drawing Machine Company, and since 1902 with the Fort Wayne Electric Company.

The latest report as to the new establishments for the manufacture of shoe machinery is of a new corporation organized at Boston to take over the plant of the Corwin Mfg. Company, Lynnfield street, Boston, and to erect two machine shop buildings on the premises. Repeated effort has been made during the past to consolidate the shoe machinery manufacturers into one great company to compete with the United Shoe Machinery Company, but up to the present time only minor mergers have been announced.

An association of jewelers of North Attleboro, Mass., is to erect a manufacturing building, to cost \$100,000. The main building will have a floor area of 57,000 square feet, and there will be a boiler house 50 feet square, in which will be installed two 100 horse-power boilers, to furnish steam for a 100 horse-power Corliass engine. Provision will be made for electric lighting. William Arnold, room 914, 43 Tremont street, Boston, has the matter in charge. Contracts will not be let before June 1.

The Winterburn Mills, Rockville, Conn., will erect a new textile plant in that town. Electric generators and other power equipment may be needed, but no machine tools for the usual repair shop will be required for about a year.

Edmond Cote, piano manufacturer, Fall River, Mass., has leased the Robeson Print Works, in that city, and will remodel the premises for the purposes of his business. No new tools will be purchased at present.

Much interest in machinery circles has been aroused by the receivership proceedings of the Shaw Machine Company, Lowell, Mass., a new corporation, which recently erected and equipped large works for the manufacture of textile machinery. At the hearing on the receivership in the United States Circuit Court at Boston it was stated that the reason for the action against the company was the lack of capital with which to complete a contract for \$350,000. Henry E. Warner, Lincoln, Mass., was appointed receiver.

Philadelphia Machinery Market.

PHILADELPHIA, PA., May 1, 1906.

The uncertainty regarding the probability of an anthracite coal miners' strike has again been brought more particularly before the trade by the conditions during the past week in connection with that matter. During the early strike talk apprehension as to the effect on business conditions brought about very conservative buying and a total discontinuance in some centers. As the matter advanced and as it became clear that many manufacturers were prepared with good stocks of fuel, a better feeling resulted and buying was done more freely. A temporary check has again occurred, owing to the critical stage of the matter, which is expected to have a termination during the coming week. Should the miners' convention decide upon a strike it is likely that business will be conducted on more conservative lines until the difficulties are settled. If, however, the demands of the miners are withdrawn more active conditions are looked forward to almost immediately.

On the whole the amount of business transacted by both manufacturers and dealers during the past month has been large and, under the existing conditions, quite satisfactory. The majority of the business placed has been for tools of the medium sizes. There was a fair demand for small tools, while that for those of the standard heavy types was rather weak. Orders were mostly of the day to day character, large propositions were few and the railroads as a rule bought only such tools as they were in immediate need of. Specifications for any large equipment for railroad shops have been notable in their absence during the past month. Manufacturers are busy in all branches of the trade. Orders received have been heavy enough to preclude the possibility of catching up on deliveries to any great extent in the near future, and in a number of cases the shipment date offered has been known to interfere materially with the consummation of a sale. Dealers' floors continue rather bare, and there appears to be no possibility of early replenishment under present conditions. During the past week sales have been somewhat heavier than during the previous one.

The export demand continues only fair. Scattering orders for some classes of tools have been booked, but the amount has not been large. The demand for the various specialties continues good, and sales have been well up to the average. The inability to make good deliveries on many lines operates materially against any increase in the foreign trade at the present time.

There has been a fairly good demand for boilers and engines, particularly for those of the higher powers, and several good contracts have recently been closed. Sales of those of the medium capacities have been fairly good, while for those of the smaller powers the demand has been rather quiet. Second-hand machinery has had a good sale, particularly such tools as those of the medium and heavier standard types.

The Eynon-Evans Mfg. Company is about to make extensive improvements to its tool room, and is in the market for a full tool room equipment. This company continues busy in all departments of its plant, the demand for acid resisting bronze castings being heavy, as is also that for blowers, condensers and the other specialties manufactured by them.

A. P. Wittman & Co., manufacturers of the Gantt furnace, for the heating and treatment of high speed steels, has removed from 233-237 Cherry street, their former location in this city, to 1223 and 1225 Spring street, where larger quarters have been secured. The new building which they will occupy will enable them to double their capacity and they propose at an early date to add two larger sizes to their present line of Gantt furnaces.

The contract for the pumps, engines, boilers, &c., for the Forrestdale filtration plant, for the city of Philadelphia, was awarded last week to Stuart Wood, representing R. D. Wood & Co., of this city. There will be six 36-inch horizontal centrifugal pumps, each having a capacity of 40,000-000 gallons of water per day of 24 hours, driven by Reeves vertical cross compound engines. The power equipment will consist of six water tube boilers, the type of which has not yet been fully determined. The boilers will be equipped with automatic stokers, economizers, super heaters, steam and feed water condensers, and every appurtenance in connection with a modern power plant. Wood & Co. are under guarantee to complete the installation of this plant in 245 days, the contract price being \$205,400.

The Southwark Foundry & Machine Company is busy in all departments, and has orders enough on its books to keep it well occupied for many months, covering horizontal and vertical blowing engines, Weiss counter current condensers, single and compound engines and electric engines for delivery to parties in Ohio, Illinois, Pennsylvania and on the Pacific Coast. Inquiries continue good, and the outlook for prosperous business conditions is considered favorable.

The E. H. Mumford Company, manufacturer of foundry molding machines, announces that the business transacted during the month of April exceeded by far that for any previous month in the company's history. The demand has been largest along the line of standard split pattern and power ramming machines from parties in the Middle West, New England, New York and local territories. Deliveries of molding machines have been heavy, and include 14 x 16, 13 x 18, 12 x 42 and 13 x 19 split pattern machines, and a number of 12-inch power rammers for parties in varying parts of the country.

The Philadelphia Roll & Machine Company has taken a large volume of business during the past few weeks. Orders for heavy chilled and sand cast rolls for rolling mills and plate and structural mills have been the largest ever received. A good volume of business has also been done in rolls for brass, copper and for rubber rolling, while those for mill parts, machinery castings and general charcoal iron castings have also been heavy. Recent deliveries of rolls cover shipments to most of the large steel and iron mills in this and in other sections of the country.

The Newton Machine Tool Works reports a very satisfactory condition of business, orders booked including, among others, 12 cold saw cutting off machines of various types, a number of automatic saw sharpening machines, several key-

seat milling machines, portable boring, drilling and milling machines, plain and special milling machines, a two-spindle vertical slabbing and milling machine, a two-spindle automobile cylinder boring machine and a number of slotting machines. Among tools completed and delivered recently may be mentioned two improved heavy slab milling machines for the American Locomotive Company's Pittsburgh plant and a large portable boring, milling and drilling machine for export to England and a three-spindle rail drilling machine for a Brazilian concern.

Alfred Box & Co., manufacturers of hand and electric power cranes, are very busy. Among orders recently received was one for two 3-ton hammer cranes for the Camden Forge Company, Camden, N. J.; one 5-ton hammer crane for the forge shop of the American Locomotive Company, at Richmond, Va.; one 20-ton, three-motor, traveling crane and runways for transfer shed of Philadelphia & Reading Railway Company, Wayne Junction, Philadelphia, Pa.; one 15-ton hand power traveling crane and one 25-ton electric traveling crane for export to Kashmir, India; one 2-ton three-motor traveling crane for the General Electric Company's Lynn shops; also one 2-ton electric and one 10-ton three-motor traveling crane for the same company's Schenectady shops; one 10-ton hand power traveling crane for the Rochester Railway & Light Company, Rochester, N. Y.; one 15-ton hand power traveling crane for the Morgan street substation of the Public Service Corporation of New Jersey, Jersey City, N. J., and six 7½-ton hand power traveling cranes, one 10-ton hand power traveling crane and one 25-ton three-motor traveling crane for the several substations of the West Jersey & Seashore Railroad Company between here and Atlantic City, N. J.

Cincinnati Machinery Market.

CINCINNATI, OHIO, May 1, 1906.

The past week has been one of continued activity in machinery circles, and there is no apparent change in the situation from that of a week since. There has been some renewed development along the line of foreign inquiry, especially from Japan. Agents from that country have been here during the week endeavoring to secure tools, but as the specifications called for immediate shipment it is hardly probable that they met with the success desired, as all of the shops are now several months behind in deliveries and consequently are not prepared to take on any new business demanding prompt action. The demand for skilled labor continues and the shortage in a number of instances is very apparent. Several of the larger companies have their buildings placarded showing this fact, but it seems almost impossible to secure sufficient men to enable them to run night shifts, as desired.

Readers of *The Iron Age* will remember an address delivered by Professor Schneider before the Employers' Association some months since, suggesting a plan whereby apprentices might be placed on a higher level by the aid of a co-operative arrangement between the Cincinnati University and the employers. Since that time the full details of the scheme has been worked out to the satisfaction of both parties, and a practical demonstration will be made, commencing with the September opening of the university. The co-operation of 35 of the largest machine and electrical manufacturing companies in Cincinnati has been secured. Each one of the plants agrees to send from two to in some cases as many as ten of the apprentices in their shops to the university to take a special course in either mechanical or electrical engineering six years in length, leading to the technical engineering degree. Under this scheme the members of each pair of apprentices will alternate with each other at the plant and at the university, one boy working at the machine for one week while the other pursues his engineering studies, exchanging places during the following week, and so on. Thus no machine at the plant will be idle and no loss will have to be borne by the employer. By omitting certain subjects, such as shop work, machine drawing, which the students under the co-operative plan will obtain a knowledge of from their experience in the plants, the special course six years long, although but for alternate weeks, will cover all the work now included in the regular four years' course. The advantage to the employer under this plan is that better prepared and more capable apprentices, high school graduates, will be secured. No boy will be admitted to the special six years' course until he has proven that he has mechanical aptitude by two or three months' work in the shop. The brightest boys will then be selected by the employers to take the special course at the university. A four years' high school education is demanded for admission to the six years' engineering course, and during this whole period the student is under the instruction of practical men in the various departments of the shop. As compared with the usual methods of engineering education—namely, going four years to college to learn the theory and serving an apprenticeship of two or three years after graduation to learn the practical, the half-time course offers advantages both financially and educationally. The Cincinnati manufacturers who have agreed to co-

operate with the university in following out the plan as outlined above are American Valve & Meter Company, Bickford Drill & Tool Company, Bradford Machine Tool Company, Cincinnati Machine Tool Company, Cincinnati Planer Company, Cincinnati Punch & Shear Company, Cincinnati Electrical Tool Company, J. H. Day & Co., Greaves-Klusman & Co., R. K. Le Blond Machine Tool Company, Lane & Bodley, Lodge & Shipley Machine Tool Company, Lunkenheimer Company, Jno. H. McGowan Company, Mueller Machine Tool Company, Miller-Du Brul-Peters, National Machine Tool Company, Smith-Meyer & Schneier, John Steptoe Shaper Company, United States Cast Iron Pipe & Foundry Company, D. T. Williams Valve Company, John B. Morris Foundry Company, Hilbert Machine Company, M. L. Andrews & Co., Hisey-Wolf Machine Company, Houston Stanwood & Gamble, Oesterlein Machine Tool Company, Queen City Machine Tool Company, Watkins Laundry Machine Company, Bullock Electric Company, Weir Frog Company and several other firms who are expected to take formal action very shortly.

The Cincinnati Iron Fence Company, which recently erected a new plant on Spring Grove avenue, is now located in its new home. This building gives largely increased facilities for the manufacture of its product and is an up to date plant. Business is reported to be in an excellent condition.

The Standard Pulley Company, now located on Pioneer street, has purchased a tract of land on Spring Grove avenue, where it is proposed to erect in the near future a model plant. Plans are now being prepared to this end which when completed will give ample space for taking care of the rapidly growing trade.

German Mineral and Metal Production in 1905.

The *Deutscher Reichs-Anzeiger*, the official organ of the German Government, publishes in its issue of March 24 the statement of the Imperial German Statistical Bureau, showing the production of minerals and metals in the German Empire in 1905. The figures given below are taken from the report and are in metric tons, the statistics for 1904 being added by way of comparison:

1905.				1904.			
Quantity.		Metric tons. Value.—Marks.		Quantity.		Metric tons. Value.—Marks.	
Coal	121,298,167	1,050,089,000		120,815,503	1,033,861,000		
Lignite	52,498,507	120,767,000	48,635,080	112,101,000			
Totals	173,796,674	1,170,856,000	169,450,583	1,145,962,000			

1905.				1904.			
Quantity.		Value.		Quantity.		Value.	
Metric tons.		Marks.		Metric tons.		Marks.	
Iron ore	23,444,073	81,771,000		22,047,393	76,668,000		
Zinc ore	731,281	47,839,000		715,729	39,479,000		
Lead ore	152,725	15,346,000		164,440	14,706,000		
Copper ore	793,488	23,500,000		798,214	21,731,000		
Silver and gold ore	9,628	1,202,000		10,405	1,206,000		
Cobalt, nickel and bismuth ore	10,848	891,000		14,016	930,000		
Manganese ore	51,463	598,000		52,886	591,000		
Pyrites	185,384	1,463,000		174,782	1,336,000		

The table below gives the total production of the metals named for 1905 and 1904, with their values:

1905.				1904.			
Quantity.		Value.		Quantity.		Value.	
Metric tons.		Marks.		Metric tons.		Marks.	
Copper ingots	31,717	44,611,000		30,264	36,305,000		
Zinc	198,208	97,920,000		193,058	84,650,000		
Lead, pigs, bars	152,590	41,049,000		137,580	32,546,000		
Litharge	3,786	1,077,000		4,332	1,117,000		
Pig iron	10,875,061	578,724,000		10,058,273	520,736,000		

The pig iron production for 1905, as given above, exceeded that for 1904 by 816,788 tons, or 8 per cent.

The Bureau of Labor at Washington is preparing a report on workmen's insurance in the United States and in foreign countries. It will describe the various systems of private and State insurance of workmen against sickness, accident, disability, old age, death and unemployment. A digest will also be given of all laws concerning workmen's insurance and the liability of employers for accidents to their employees. The Commissioner of Labor desires to obtain complete information in regard to relief funds and mutual aid associations, as well as concerning benefit and relief funds of labor organizations.

The Special Steel Castings Syndicate in Germany has advanced prices 5 per cent. The sales of the syndicate were 46,539 tons, valued at \$4,917,305, in 1905. In 1904 they were 43,000 tons, valued at \$4,269,484.

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HARDWARE

THIS is the time for Hardware merchants and manufacturers to use their influence to prevent the enactment of legislation persistently urged for the advancement of catalogue house interests which would greatly disturb established channels for the distribution of goods through wholesale and retail houses. The danger is imminent, and calls for prompt and energetic action advising the legislators, whether in the House or Senate, of the real sense of the business community in regard to measures which would be, intentionally or unintentionally, in the interest of retail mail order houses.

The retail merchants of the country, and especially in the Hardware trade, who have been made the particular object of the attack of the catalogue houses, are now face to face with the most serious situation that has ever been presented since parcels post, consolidation and post check projects were first brought forward in Congress. The various organizations in the Hardware trade have devoted an enormous amount of time and much serious thought to the catalogue house problem, and many valuable suggestions for meeting this competition have been evolved, but the results of all these labors now threaten to be swept away in a few days by the ill advised, not to say misguided, action of Congress. Only the most prompt and energetic action on the part of the Hardware trade, assisted by the co-operation of other trades in all sections, can prevent Congress from enacting two measures of the utmost value to the catalogue concerns and most injurious to the retailers, namely, the project for consolidating third and fourth class mail matter, thereby reducing the postage on merchandise from 16 to 8 cents per pound, and a modification of the post check scheme, of which the Postmaster General has become an ardent champion and the enactment of which he strongly urges in a communication he has just addressed to the Postal Committees of both Senate and House.

The consolidation project has been hanging over the retail trade for several years, but not until last year was it given serious consideration in Congress. The House committee rejected it, but the Senate committee incorporated it in an amendment which was attached to the annual Post Office Appropriation bill. Under the rules of the Senate, however, new legislation can be added to a budget measure only by unanimous consent, and the point of order having been raised by Senator Dolliver of Iowa, the amendment was stricken from the bill. The friends of this scheme, however, were not discouraged, but went to work with renewed energy, being assured of the support of the Post Office Department and of the co-operation of the mail order houses, whose interest in the project is of overshadowing importance, inasmuch as half a dozen of these concerns would probably save an aggregate of more than \$500,000 per annum in their postage account.

The associations of Hardware jobbers, manufacturers and retail merchants have with scarcely an exception expressed themselves strongly as opposed to the parcels post or any measures which would give the catalogue houses further advantages over the local merchants. There is reason to fear that these resolutions have too often been used with little effect, as instead of having them brought

forcibly to the attention of Senators and Representatives with the impressiveness and emphasis which the circumstances justify there has been too frequently only a perfunctory use made of them. Indeed, it is not unlikely that many of the legislators are scarcely aware of the deep and practically unanimous feeling of the trade on the subject. The danger at the present time is so imminent that it becomes all who are interested in preventing the consummation of the plans under consideration to take the matter up immediately and individually, advising with unmistakable emphasis their Senators and Representatives of their opposition to the proposed legislation and their reasons as business men for opposing it. In addition to this, petitions and personal letters should be sent to the committees in Congress, with whom so largely the determining of the matter rests.

Inasmuch as the Consolidation bill is now before the Senate and in the care of the Committee on Post Offices and Post Roads, it is especially important that efforts should be directed at once to informing the members of that committee of the manner in which the bill is regarded by the business community and the serious objections to its enactment. This committee is constituted as follows, under the efficient leadership of Senator Penrose:

Boies Penrose, Pennsylvania, chairman.
Jonathan P. Dolliver, Iowa.
Redfield Proctor, Vermont.
Julius C. Burrows, Michigan.
Nathan B. Scott, West Virginia.
W. Murray Crane, Massachusetts.

Chas. W. Fulton, Oregon.
Albert J. Hopkins, Illinois.
Thomas H. Carter, Montana.
Alexander S. Clay, Georgia.
Charles A. Culberson, Texas.
James P. Talliaferro, Florida.
Furnifold McL. Simmons, North Carolina.
Isidor Rayner, Maryland.

Letters should be addressed to the above Senators, SENATE CHAMBER, WASHINGTON, D. C.

The Post Office Committee of the House of Representatives has a membership as below, under the leadership of Mr. Overstreet, who has given good evidence that he fully understands the disastrous results which would follow from the proposed action:

Jesse Overstreet, Indiana.
Victor Burdock, Kansas.
John J. Gardner, New Jersey.
John W. Dwight, New York.
Nehemiah D. Perry, Connecticut.
John A. Moon, Tennessee.
Thomas Hedge, Iowa.
James M. Griggs, Georgia.
Joseph C. Sibley, Pennsylvania.
Howard M. Snapp, Illinois.

David E. Finley, South Carolina.
James T. Lloyd, Missouri.
Herman P. Goebel, Ohio.
John H. Small, North Carolina.
Halvor Steenerson, Minnesota.
Willson S. Hill, Mississippi.
William H. Stafford, Wisconsin.
Marcus A. Smith, Arizona.
Archibald B. Darragh, Michigan.

The members of this committee should be addressed "care of HOUSE OF REPRESENTATIVES, WASHINGTON, D. C."

In bringing this matter to the attention of the law-makers at Washington it should be remembered that it is important that all classes be represented in the protests made. The smaller merchants must not neglect to do their part, for their views will have weight as representing a very large body of distributors. At the same time it is especially incumbent upon the larger houses, notably the Hardware jobbers of the country, as merchants of commanding position and influence, to communicate with the legislators, informing them of the perils to the public welfare of anything which makes the catalogue house business easier and more profitable. If the members of the National Hardware Association and other representative job-

bers should write strong letters on the subject it would be a great aid and would accomplish infinitely more than a raft of resolutions, which are not followed up and seconded with energetic personal appeal. There is an opportunity in this way for the jobbing trade to render a great service to the retail trade whose interests are menaced.

Condition of Trade.

With the advance of the season there is naturally a falling off in the purchasing of the wholesale merchants whose requirements were covered by orders placed months ago. There are, however, more or less sorting up or special orders, which are going in to the manufacturers constantly, who at the same time are receiving a good many orders from retail merchants, with whom practically all of them have more or less to do, even though the bulk of their business is with the jobbers. In a great many lines, too, manufacturers of parts which enter into other articles have a good deal to do with the factory trade. In nearly all departments of the Hardware field, including the goods which are not strictly Hardware in the old and narrow sense of the word, but which are handled generally by the Hardware merchants, there is plenty of business doing to keep the factories running to their full capacity, many of them being indeed behind their orders, thus suffering some annoyance themselves and subjecting their customers sometimes to serious inconvenience. They are learning that while it is very desirable to have well filled order books there is a disadvantage connected with the inability to execute orders promptly, especially if it is necessary to force the plant unduly. There is considerable inconvenience suffered by the manufacturers on account of difficulty in obtaining material, a condition of things which is owing principally to the slow shipment on the part of the mills, but also to delayed delivery on account of insufficient or congested transportation facilities. Many manufacturers have been able to minimize the trouble on this score by early ordering. It seems not unlikely that the disaster at San Francisco will aggravate this difficulty, as there is little doubt that what is required for the rebuilding of the city will be given the preference in the shipments of the mills. The same principle will undoubtedly be applied to Hardware of all kinds that is needed for the re-establishing of comfort and order and the resumption of business activity. In this way many goods which under different conditions would have gone to other parts of the country will be sent to the Pacific Coast. Those who are thus disappointed in the receipt of goods required for their trade will have to bear the inconvenience philosophically and cheerfully, as a slight sacrifice for the benefit of the afflicted city. In another column we refer to requests from some of the houses in San Francisco for catalogues, quotations, &c., to take the place of those destroyed, and we have no doubt that they will receive the best attention if they have not already been anticipated. An opportunity is indeed afforded manufacturers generally to communicate with all the Hardware houses whose establishments have been destroyed, putting them in possession of their literature and tendering the best service they can offer in the circumstances of extreme need which have been developed.

Chicago.

While the total volume of business closed by several of the largest local jobbers during April shows no marked

increase over the same month last year a comfortable gain is reported, although the per cent. of increase does not compare favorably with the earlier months of the year. This would indicate that trade is gradually settling down to a normal basis and, furthermore, that the future buying during January and February and in some cases during the fall months affected the normal distribution to no inconsiderable extent. Wire Cloth is reported extremely scarce and jobbers in some of the Western States have advanced prices from 5 to 10 per cent. On the other hand, manufacturers' quotations remain unchanged, although with few exceptions they are unable to fill orders for delivery this season. Owing to the high prices ruling on Screen Doors and Windows for delivery, the present season retailers did not buy as heavily in large lots as in former years, and the collective car lot orders made by manufacturers, according to reports, were not nearly as numerous as last season, when quotations were much lower, and now that the season is at its height merchant's stocks are depleted and heavy shipments are being made by jobbers. The situation on Poultry Netting is almost identical, retailers having purchased below normal requirements and are now hurrying deliveries from stocks to meet the consumptive demand. Manufacturers of Steel goods and Tools continue behind on deliveries, and demand shows no indication of lessening in the immediate future. Black and Galvanized Sheets are stronger, and some of the independent manufacturers favor an advance on account of the high cost of raw material. No marked increase in the demand for Hardware has set in from San Francisco, although large stocks will have to be replenished. Heavy shipments of Nails have, however, already been made, and tools to be used in the erection of temporary structures will be required in large number.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—Business during the month of April throughout the Trans-Missouri region has been very satisfactory. At this season of the year pleasant and stormy days follow each other closely, which will probably represent the weather conditions during the month of May. The agricultural communities are taking every advantage of each favorable opportunity to make preparations for the necessary field work. A good supply of moisture throughout the corn belt has placed the soil in admirable condition for the reception of seed grain, so that conditions as they exist at the present time, as far as climatic influences are concerned, are just about what is required.

The satisfactory volume of business now being transacted warrants the conclusion that a heavy trade will continue from now on. A large amount of building is in progress throughout the entire Western territory, consequently labor of all kinds can find ready employment at good wages.

Prices are held remarkably firm, and if the coming crops are anything like in volume corresponding to the past few seasons business for the fall months will be something very extensive.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—April has been a very fair month in the trade. Business has been active. Conditions have been favorable for trade to the extent of current wants and the business of the month will compare favorably with that of April in past seasons. During the last half of the month the weather was very favorable for seeding and the farmers throughout the Northwest have been busy putting in their crops. This of course has reduced trade, but no more so than usual at this season. Notwithstanding the high price of lumber and labor, building operations are going on actively. At the same time high prices on these commodities will affect future building operations to some extent. Hardware, iron and steel are not high and are not chargeable with having been procuring causes in deferring building operations. It is probable that owing to the vast consumption of lumber prices on it will never go back to the figures that have prevailed in the past. Labor is excessively high, however, and it is reasonable to expect that the scale of

wages of to-day will not hold permanently. Collections are fair and prospects for the summer's business are good.

The civilized world stands appalled at the magnitude of the calamity that has befallen San Francisco. It is fortunate indeed, and seems marvelous, that the loss of life is not larger. Sympathy and substantial help are going out from all directions and the people of the stricken city will rise up out of their misfortune, and the new San Francisco that is to be will doubtless be far ahead of the one that has been.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—When April comes in business with the Southern Hardware jobbers usually begins to lighten up to a considerable extent. This has been the case this season, but the business has not diminished as much as it generally does. In fact, April will show a large gain over the same month last year. All or most all of the Southern Hardware jobbers are either invoicing or preparing to do so, as this work begins the latter part of April or the 1st of May.

All of the jobbers that we have seen—and we have talked to quite a number of them during the past few weeks—are well pleased with the spring business they have had. They say that conditions in the South are excellent, and that prospects for summer and fall trade were never better. There is no doubt that an enormous acreage is being planted in cotton this spring, and the Southern farmers are now about the busiest people you will find anywhere.

We have been advised of quite a number of advances in prices during the past few days and the market looks good to us. Collections are very satisfactory.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—The month of April is terminating with a very nice increase in volume of business over the first part. It is remarkable what a large part the weather plays in the sale of goods.

March was one of the most disagreeable months we have had for a year; the country roads were bottomless pits, and no one could travel on them. In spite of this fact it was our record month—dealers bought goods on faith. April has been ideal as far as weather is concerned, and one would naturally expect much larger sales than during March, but it is evident that the retailers had to devote the first three weeks of April to the selling of goods they had already bought; since then they have been buying freely again.

Last year at this time we were troubled with terrible floods. This year we want more rain. So it is pretty hard for the average man to figure ahead on weather conditions. The first six months of the year, however, promise to be very satisfactory in every way.

At this time, of course, all eyes and hearts are turned toward our stricken sister city, San Francisco. The practical sympathy of the American people has never been more promptly shown than in this terrible calamity, and it does seem as if it was a good thing to have our sympathies stirred occasionally, "lest we forget."

We are glad to note that one of the large Hardware jobbing houses in that city has not been injured to any extent. We rejoice with them over their escape and sympathize very, very deeply with the others who have been less fortunate.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The excellent volume of business which has characterized every week and month of this year still continues. There is no sign of timidity in investment or shrinkage from large undertakings, which were fairly well under way before we received the great shock which came to us overland from the Pacific Coast. This has been the all-absorbing topic ever since it happened. The first effort and impulse are to relieve our fellow creatures in suffering and distress; the second one is the consideration of the probable effects of such dire disturbance and actual loss on general conditions. The immense destruction of property and wealth coming suddenly like this is bound to react in some shape, though the country is so prosperous every one hopes that

the reaction will be gradual and thus distributed over time and financial institutions and individuals. What would seem at first to be a crushing weight may be borne by being widely distributed and order brought out of confusion.

The immense amount of building supplies, which it is thought would affect the steel mills and the Hardware manufacturers to such an extent as to interfere with other obligations, is of course somewhat exaggerated. It is very easy to get to dealing with immense figures, and a few 0's more or less do not seem to stand in the way of your average newspaper statistician.

There is ample room for the inventor as we face unusual conditions. If we are to have these seismic disturbances in certain belts of territory we shall have to adapt our water pipes and other public utilities to them. The invention of a flexible water main for the towns in California will be now in order. The demand for ordinary labor to reconstruct in great haste, which is indicated to be the order of the day by dispatches from the hustling citizens of San Francisco, may do something toward modifying the Chinese Exclusion act. The barriers, while not entirely taken down, may be lowered a notch or two for the right sort of Celestials who would come in and help for the time being. It might be well for the police of the great city to see that what they—the Chinese—do build is mainly above ground and not in subterranean passages, as the reports would have us believe has been the case heretofore.

The disaster has had the effect of eclipsing the performance of Mt. Vesuvius, which had been engaging our attention before that; and minor casualties, such as a cyclone in Mississippi or Texas, have the singular effect of serving to reduce the acuteness of feeling incident to the greater destruction, as they demonstrate that nature can do something in moderation even in her destructive moods.

Portland, Oregon.

FAILING, HAINES & McCALMAN.—At present all jobbers are waiting to see the result of the San Francisco fire on trade and in the interval are helping to swell the Portland relief fund, which to-day stands at about \$225,000. Portland's relations to San Francisco have always been close, and this city takes the calamity as its own.

As a result of the relief work stocks in certain lines have already badly broken up, and we expect a shortage in Hardware and in fact in all lines. The burning of the agency stock has disorganized trade in such lines, but jobbers are covering as quickly as possible. Business in this territory looks favorable, except for danger of shortages, due to the abnormal demand.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The overwhelming calamity which has befallen our fellow Hardwaremen and citizens of the Pacific Coast has so absorbed attention that little else has been noted. Almost every one is interested in California, either by ties of blood or friendship, and only within the last few days has it been possible to obtain any definite information from them. We have noted in the comments that tendency of human nature to find some good coming out of the misfortunes of other people, and some are not lacking the temerity to offer an explanation of why such a visitation, as they call it, was sent to the Pacific Coast. We believe there will be but little dissent, however, from the statement that such a shock as this stirs up the milk of human kindness, and the consequent loosening of purse strings makes for the happiness of the giver even before his gift has reached the other fellow. If this be true a very widespread blessing has come to this country, for it is hard to find a town or hamlet which has not contributed to the golden flood that has poured Westward.

Summer days have come and the demand for seasonable stock is taxing the ability of local houses to their utmost. Were it not for the menace of a coal strike April would have closed with an almost phenomenal record. Even with this handicap the month will easily be a record breaker.

NOTES ON PRICES.

Wire Nails.—Shipments from mills have continued large, including contract deliveries and new orders, so that April proved a heavy month. An indication of a continuance of demand is given in the comparatively light stocks in the hands of the trade, and the building activity throughout the country. Prices are firm and quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in ten days:

Carloads to jobbers.....\$1.85
Carload lots to retail merchants..... 1.90

New York.—Small lots from store are in fair demand, and it is reported that jobbers' prices are being well maintained. Small lots from store are quoted on the basis of \$2.15 per keg.

Chicago.—Filling in orders continue to be placed by all of the large Western distributors, as stocks of Wire Nails throughout the country are exceedingly light. Specifications on existing contracts are also very heavy, and so far as shipments are concerned the month of April will probably exceed that of any month in the history of the trade. Rumors of concessions in mill prices are without foundation. Quotations are firmly maintained, as follows: \$2 in car lots to jobbers and \$2.05 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—We note a continued good demand for Wire Nails, the amount of new business being entered by the mills showing a steady increase. Specifications on contracts continue to come in freely and shipments by the mills are heavy. Prices are very well maintained, and it is a remarkable fact that the present price on Wire Nails has been steadily maintained since September 28, last year, on which date the mills advanced prices from \$1.80 to \$1.85 per keg. The market is firm, and we quote: Wire Nails, \$1.85 in carloads to the large jobbing trade and \$1.90 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in ten days.

Cut Nails.—At the meeting of the Cut Nail Association held last week no change in prices was made. Steel is at a figure which reduces the margin of profit to those manufacturers of Nails who have not Steel contracted for. A steady demand characterizes the market, but it is not so large as to tax the capacity of the majority of the mills in filling orders. Quotations are as follows: \$1.80, base, for carload lots, f.o.b. Pittsburgh; \$1.85 for less than carloads, f.o.b. Pittsburgh; \$1.95 for carload lots, on dock, New York; \$2 for less than carloads, on dock, New York. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

New York.—Cut Nails continue in demand in about the usual proportion to Wire Nails. Jobbers' prices are reported as being maintained. Quotations are on the basis of \$2.05 per keg.

Chicago.—At the meeting of the Cut Nail Association held last Wednesday prevailing quotations were reaffirmed. Specifications continue in good volume and a considerable amount of new business is going to the mills. Quotations are firmly maintained as follows: Steel Cut Nails in car lots, \$1.95; less than car lots, \$2; Iron Cut Nails, \$2.05 in car lots; less than car lots, \$2.10.

Pittsburgh.—At a meeting of the Cut Nail Association held in Philadelphia last week prices were reaffirmed. We note a moderate demand, which the mills are filling promptly. Demand from the retail trade is showing improvement. We are advised that the market is quite firm and we quote Cut Nails as follows: \$1.80, base, for carload lots, f.o.b. Pittsburgh; \$1.85 for less than carloads, f.o.b. Pittsburgh. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

Barb Wire.—Specifications on contract orders are being received in good volume by the mills. New business, largely from railroad companies, is of fair proportions. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.00	\$2.30
Retailers, carload lots.....	2.05	2.35
Retailers, less than carload lots.....	2.15	2.45

Chicago.—New tonnage that is now received is being placed almost entirely by Western railroads that are making extensions, although a few filling in orders are being received from the Hardware trade. Quotations are firmly maintained, as follows: To jobbers, Chicago, car lots, Painted, \$2.15; Galvanized, \$2.45. To retailers, car lots, Painted, \$2.20; Galvanized, \$2.50. Retailers, less than car lots, Painted, \$2.30; Galvanized, \$2.60. Staples, Bright, in car lots to jobbers, \$2.10; Galvanized, \$2.40; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Demand is showing some betterment and a large tonnage of Barb Wire is now being used in railroad construction, which is quite active in the West. The mills still have contracts on their books on which buyers are specifying freely. The market is firm, as follows: Painted Barb Wire, \$2, and Galvanized, \$2.30, in carload lots to the large jobbing trade, with the usual advance of \$1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in ten days.

Smooth Fence Wire.—From various sources, including telephone companies and Wire Fence manufacturers, orders are being received in large volume by the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in ten days:

Jobbers, carloads\$1.70
Retailers, carloads 1.75

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	13	14	15	16
Annealed.....Base	\$0.05	.10	.15	.25	.35	.45	.55	
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—Telephone companies continue to buy freely, and the many extensions that are being made to telephone lines throughout the West have resulted in a heavier consumption than in former years. Specifications from Fencing manufacturers have fallen off to a large extent, as the fence season is rapidly coming to a close. Quotations are firm and unchanged, as follows: To jobbers, \$1.85, f.o.b. Chicago, in car lots, and car lots to retailers, \$1.90.

Pittsburgh.—Demand from Fencing manufacturers and also from the fence companies is very heavy, and the mills that make Fence Wire are very much behind in deliveries and have enough tonnage booked to take their output to July 1. The market is firm, but there is no indication of any advance in prices in the near future. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in ten days:

Jobbers, carloads\$1.70
Retailers, carloads 1.75

The above prices are for base numbers, 6 to 9.

Window Glass.—A joint meeting of Window Glass manufacturers and jobbers will be held this week, the object being to see if better market conditions cannot be brought about than have ruled thus far during the present fire. In the meantime an effort is being made to learn the amount of glass in manufacturers' and jobbers' hands, so that an accurate report of the situation can be made at the meeting. The production of glass will decrease as warmer weather comes on, while an unusual demand is anticipated from Pacific Coast cities during the summer months. The outlook is for a scarcity of Glass, particularly in some sizes. New York quotations are as follows: 90 and 10 per cent. discount for all sizes of single and double strength.

Refrigerators.—The advance of about 10 per cent. made recently by many manufacturers of Refrigerators appears to have been necessitated by the exigencies of the market. So far as known, there was no concerted action or getting together of manufacturers, East or West. All, however, were filled up with orders, and in view of the high prices prevailing on raw material leading producers decided to accept no more orders, except

at advanced prices. In justifying the advance attention is called to a comparison of costs to-day with those of five or six years ago. Ash lumber then sold at \$12.50 a thousand; it is now quoted at \$28 to \$31. Zinc has about doubled in value; Solder, a large item in a Refrigerator factory, has more than doubled. Copper has advanced, of course with fluctuations, from 11 to nearly 19 cents a pound. This tells why trimmings are up. Nails and Screws are much higher; crating stock costs more than double and labor commands from 30 to 35 per cent. better wages. During the period while these costs have thus advanced, Refrigerators are estimated to have advanced in the neighborhood of 30 per cent.

Wire Cloth and Poultry Netting.—There is an active demand for both Screen Wire Cloth and Poultry Netting, and something of a scarcity is developing. Prices are, however, substantially as they have been.

Heavy Hammers.—The manufacturers of Heavy Hammers are working together with admirable harmony and the agreed prices are quite regularly maintained. Quotations, however, by jobbers introduce an element of some irregularity, as there are stocks on hand purchased at prices lower than those now ruling.

Wire Picture Cord.—The manufacturers of Wire Picture Cord have recently been in conference, and as a result irregularities in quotations have to a good extent been corrected and prices announced embody an advance of 10 per cent. or more.

Steel Squares.—The higher prices for Steel Squares agreed upon by the manufacturers are fairly well maintained. Stocks in the jobbers' hands, however, enable them to sell at discount 75 and 10 to 80 per cent., which is lower than the present price of the goods to the large trade would permit.

Rope.—Demand continues in about the same volume as for the past two or three weeks. Manufacturers are anticipating a larger business as the season advances. Manila Rope is particularly firm, owing to the strong position of Manila Hemp. While there is a call for a considerable quantity of inferior quality Rope, some manufacturers are of the opinion that demand for the better grades is improving, with a corresponding diminution in orders for the mixed kinds. If this is a correct view of the situation, it is a hopeful sign. Quotations are as follows: Pure Manila, 12½ cents; B quality, 11½ cents; Pure Sisal, 9½ cents; No. 2 quality, 8 cents per pound.

Paris Green.—Since the announcement of prices orders have been received by manufacturers in fair volume. A number of merchants had placed contract orders previously on the memorandum or price-less basis, invoices to be at the price ruling at the time of shipment. On April 23 there was an advance of 1 cent per pound in the base price. There does not seem to be any immediate prospect of a further change in prices, but should a change occur makers are of the opinion that it will be in the nature of an advance. Manufacturers, as usual, are carefully watching the trend of demand so as to have as small a stock as possible to carry over after supplying the requirements of their customers. Quotations on 5 tons and over are as follows:

Arsenic kegs.....	21 c.
Kegs, 100 to 175 pounds.....	21½c.
Kits, 14, 28 and 56 pounds.....	22½c.
Paper boxes, 2 and 5 pounds.....	22½c.
Paper boxes, 1 pound.....	23 c.
Paper boxes, ½ pound.....	24 c.
Paper boxes, ¼ pound.....	25 c.

Terms, 30 days, f.o.b. New York.

The following extras are charged for smaller quantities:

5000 to 10,000 pounds.....	½c.
1000 to 5000 pounds.....	1c.
500 to 1000 pounds.....	1½ to 2c.
Less than 500 pounds.....	2 to 3c.

White Lead in Oil.—The market is firm, owing to the strong tone of the Lead market. Demand for White Lead in Oil has been unfavorably affected, to some extent, in this territory by the prospect of painters' strikes, which have been threatened in this city and at nearby points. Quotations are as follows: In lots of 500 pounds or over, 7¼ cents per pound; in less than lots of 500 pounds, 7½ cents per pound.

Linseed Oil.—The market continues quiet, as large buyers have supplies for present requirements, which are covered by contracts placed some time since. April is conceded by the trade generally to have been an exceptionally quiet month in the Oil trade, and a revival of active buying is not anticipated for a week or two. Quotations are as follows: City Raw, 42 to 43 cents per gallon; out of town Raw, 39 to 40 cents per gallon. Boiled Oil is 1 to 2 cents per gallon advance over Raw.

Spirits Turpentine.—The market has been devoid of activity during the past week, as is usual toward the end of the month. A slight improvement was noticed after May 1 in the local market in the demand for small lots. New York quotations are as follows, according to quantity: Oil Barrels, 67 to 67½ cents; Machine Made Barrels, 67½ to 68 cents per gallon.

TRADE ITEMS.

THE IOWA HARDWARE JOBBERS' ASSOCIATION held a special meeting at Burlington, Iowa, April 18, for the discussion of important matters relating to the Hardware business. The meeting was called by President F. E. Cutler of the Cutler Hardware Company, Waterloo. Representatives from the following jobbing houses in the State were in attendance: Drake Hardware Company, Burlington; Chas. F. Schmidt Hardware Company, Burlington; C. E. Armstrong & Co., Clinton; Brown-Hurley Hardware Company, Des Moines; Luthe Hardware Company, Des Moines; A. Tredway & Son Hardware Company, Dubuque; Prusia Hardware Company, Ft. Dodge; Huber & Kalbach Company, Oskaloosa; Harper & McIntire Company, Ottumwa; Geo. Haw & Co., Ottumwa; Cutler Hardware Company, Waterloo.

THE MARSHALL-WELLS HARDWARE COMPANY, Winnipeg, Man., will erect a new building facing on Market street, having a frontage of 180 feet on Market street and a depth of 130 feet to railroad tracks. The company owns and now occupies 170 feet frontage on Bannatyne avenue, directly in the rear of the Market street site and separated from it by the railroad tracks. It is anticipated that at some future time, when the Market street property has been taxed to its capacity, a building may be erected on Bannatyne avenue of the same type and these two buildings connected over the railroad tracks by bridges. The Market street building will be of modern construction, built of stone, and will be eight stories in height. It is expected to have it ready for occupancy April 1, 1907.

A HARDWARE firm in the Northwest suggests that now is a good time to display a sign in the show window reading "MUCK RAKES, 20 CENTS."

C. E. BAYLOR COMPANY, Morristown, Tenn., is erecting a five-story brick addition to its store on Main street. This, with the large warehouse on Cumberland street, will enable the company to carry a larger and better assorted stock and take better care of its fast growing wholesale business in Hardware, Stoves, &c.

NATIONAL PAINT WORKS, with main office and factory at Williamsport, Pa., have removed their New York office from 92 to 100 William street. Here they have much larger quarters and are thus in a better position to look after the interests of their customers in the East. The Western sales office is located in Chicago.

THE A. H. GREEN COMPANY, manufacturer of Locked Corner Boxes and Box Shooks, has removed from its former location at 22 Park place, New York, to the Matlage Building, 97-101 Warren street.

The Lewiston Fuel & Transfer Company has recently increased its capital stock from \$15,000 to \$100,000 to meet the demands of its business at Lewiston, Idaho. Bernard Jacobs, formerly at Uniontown, Wash., has entered the firm and will take an active part in the management of the business. A large two-story warehouse, 50 x 100 feet, is in course of construction, and the company will also open a sample room in the center of the town, which will be 50 x 100 feet.

DANGER OF LEGISLATION FAVORING CATALOGUE HOUSES.

FROM OUR SPECIAL WASHINGTON CORRESPONDENT.

WASHINGTON, D. C., May 1, 1906.

WHEN the present Congress opened the House committee was at once besieged by the advocates of the plan for consolidating third and fourth class mail matter, who demanded hearings and who threatened the dire vengeance of the farmers and "the people" against any Congressman who should have the temerity to oppose this project. The Postmaster-General and several of his assistants advocated the change in their annual reports, but Chairman Overstreet of the House committee and nearly all his colleagues stood out steadfastly against the desired amendment, and, as heretofore stated in this correspondence, the bill was reported to the House and passed by that body without the addition of any of these populist propositions.

Consolidation Bill Before the Senate.

The bill is now before the Senate committee and the greatest possible pressure is being brought to bear upon that body to incorporate in the bill the consolidation plan. So-called boards of trade, trades leagues and other organizations of a general character, which rarely reflect the true sentiment of the business community, are forwarding petitions and memorials and every effort is being made to drag the committee into adding the desired amendment to the pending bill. The various Hardware associations at their conventions held within the past three months have uniformly adopted resolutions against the consolidation plan, but these resolutions have usually been forwarded to individual Senators and only in rare cases have been brought to the attention of the members of the Senate Post Office Committee. The friends of the consolidation scheme are far shrewder and are centering their pressure directly upon Senator Penrose and his associates on the committee, so that while the great influence of the Hardware organizations has been largely dissipated the "demand" for consolidation is being directed toward the handful of men who will determine the question as to whether the desired amendment shall be incorporated in the appropriation bill.

Post Check Currency System.

Not content, however, with urging the consolidation plan the advocates of a post check currency system have made a simultaneous assault upon both House and Senate committees and have most opportunely secured the co-operation of the Post Office Department. The general features of the post check system, devised by C. W. Post, a patent food producer of Michigan, who has spent many thousand dollars maintaining a bureau in Washington to advance this scheme, have heretofore been described in this correspondence. Briefly stated, the plan is to retire all \$1, \$2 and \$5 bills now in circulation, except bank notes, and to replace them with certificates which ordinarily would pass from hand to hand as currency, but which at any time might be converted into post checks by writing the names of a payee and the remitter on blank lines provided for the purpose. The scheme is wholly inadequate, for it is obvious that if there is any demand for facilities for sending money through the mails it is for the transmission of fractional amounts, which are not provided for, a fact that is conceded by the author of the plan in a pamphlet just issued, in which he states that if the \$1, \$2 and \$5 post checks are well received by the public Congress will be asked to issue \$50,000,000 worth of fractional currency. It is an interesting fact in this connection that prominent among the list of indorsers of this project published in the pamphlet referred to are several mail order houses, headed by Sears, Roebuck & Co., and followed by half a dozen manufacturers of patent medicines, the demand for which is largely stimulated by the liberal use of the mails.

The post scheme might perhaps be left to take care of itself in spite of the fact that both House and Senate committees during the past week accorded to its inventor and his paid attorneys hearings at which the al-

leged merits of the project were fully set forth. A far more serious project has now been brought forward, however. It will be remembered that in the last annual report of the Postmaster-General he referred to the fact that a commission had been appointed to investigate the desirability of a post check currency and to draft a bill if it should be deemed advisable. The committee has drawn a bill which the Postmaster General has forwarded to the Senate with an urgent recommendation for its prompt passage at the present session. The text of this bill is as follows:

The Text of Bill.

Be it enacted, &c., That to facilitate the transmission of small sums through the mails, the Postmaster-General is empowered to authorize postmasters at money order offices, and at such other offices as he may designate, under such regulations as he may from time to time prescribe, to issue money orders, without corresponding advices, on a form to be prescribed and furnished by him; and a money order issued on such form shall be designated and known as a "postal note," and a fee to be fixed by the Postmaster-General shall be charged for the issue thereof, except that postal notes for amounts less than 10 cents may be issued without fee at the discretion of the Postmaster-General; provided, that postal notes shall be for fixed amounts not above \$2.50 and shall be redeemable or payable at any money order post office or at any other post office designated by the Postmaster-General for that purpose; provided further, That said postal notes shall not be negotiable, and shall not be payable after the expiration of three calendar months from the last day of the month of their issue, except in the case of postal notes issued in the Territory of Alaska, or in Guam, Tutuila and the U. S. Postal Agency at Shanghai, China, and payable in the United States, or vice versa, which shall be payable at any time within six calendar months from the last day of the month of issue.

Sec. 2. After a postal note has once been paid, to whomsoever paid, the United States shall not be liable for any further claim for the amount thereof.

Sec. 3. Postmasters at offices of the third and fourth classes may be allowed as compensation for issuing postal notes of the fixed denominations from 10 cents to \$2.50, inclusive, such part of the fees thereon as the Postmaster-General may prescribe, but such commissions shall not exceed the rate of \$1 per 100 notes.

Sec. 4. A duplicate of a lost, destroyed or invalid postal note may be issued by the Post Office Department under such regulations as the Postmaster-General may prescribe, provided application therefor be made within one year after the postal note has become invalid or has been lost or destroyed and not before the expiration of the period within which it is payable. Duplicates shall be valid for the same length of time as were the original notes which they replaced. A duplicate shall not be issued of a postal note for which no fee has been paid.

Sec. 5. All provisions of the statutes relating to money orders so far as the same may be applicable and not inconsistent with the provisions of this act shall apply to the postal notes herein described.

Sec. 6. That the sum of \$150,000, or so much thereof as may be necessary, be, and the same is hereby, appropriated out of such money in the Treasury not otherwise appropriated, to be used and expended as the Postmaster-General may direct, for carrying into effect the provisions of this act during the fiscal year ending June 30, 1907; provided, that of said amount not exceeding \$20,000 may be used in payment of the salaries of one Postal Note Agent and necessary assistants, and such additional clerks as for the purposes of this act may be required in the Post Office Department.

This bill was transmitted to the House and Senate committees by the Postmaster-General in a letter in which Congress is earnestly urged to put the scheme through without delay, and, if possible, prior to adjournment for the summer recess. Referring to the work of the committee appointed to devise a currency system

The Postmaster-General Says:

As a result of its labors, the committee after careful examination and consideration of numerous plans and devices submitted has devised a form of postal note which it is believed will, if adopted, fully meet the demands of the public and the requirements of the Department, and prove itself in every way superior, in so far as the needs of this country are concerned, to any form of postal note in use in other countries, and to any plan for transmitting small sums of money through the mails which has been presented to this Department.

The committee also prepared a draft of a bill, which is herewith submitted, entitled "A bill to facilitate the transmission of small sums through the mails," which if enacted into law would empower the Postmaster-General to introduce postal notes such as are therein briefly described at all money order offices, and at such other offices as he might designate, under such regulations as he might from time to time prescribe. The postal note would serve as an adjunct to the money order system, would combine the essential elements of simplicity and safety, would be sold for a lower fee than is charged for the present postal money order, and would not, it is believed, impair the revenues of the service.

Appropriation Recommended.

The Postmaster-General requests an appropriation of \$150,000 to meet the cost of installing the proposed system, that amount to be used to pay the salaries of a postal note agent and a corps of assistants and inspectors to supervise the plant of the contractor who should engage in the manufacture of the notes. Concerning the sale of the notes and their use by the public, the Postmaster-General says:

Postal notes of the various fixed denominations from 10 cents to \$2.50, inclusive, could, it is believed, properly be sold to business houses in quantities, with the restriction that no one concern would thus receive more than would probably be required for use during one week. Notes if thus sold to business houses would bear the actual date of issue impressed thereon by the postmaster's dating stamp, and also be signed by the postmaster, or for him by his duly authorized clerk. Notes of the smaller denominations below 10 cents, however, would not be sold in quantities, and only to individuals singly, and at post offices.

The committee believes that a force of not more than eight clerks would be required in the Post Office Department to put the postal note business into operation in case the bill referred to is enacted into law, and that such clerical force should consist of a clerk in charge at a salary of \$1400 per annum, and not more than seven clerks at \$900 each; and that in addition thereto a postal note agent at a salary of \$2500 per annum and necessary assistants would have to be employed at the place where the plant of the contractor for furnishing the postal note forms would be situated.

The committee reports that it is satisfied that the enactment of the proposed measure into law would result in a great diminution of the amount of actual money transmitted through ordinary mails, and in the disuse to a great extent of postage stamps for small remittances; and furthermore, that the general introduction of the proposed postal notes would almost entirely obviate the necessity for use of postage stamps and coins in remittances of small amounts through the mails.

In transmitting to you this communication and the draft of bill "to facilitate the transmission of small sums through the mails," I desire to state that I fully concur in the views of the committee that there is a general demand on the part of the public for a postal note or some other device which will obviate the necessity for the use of postage stamps and coins in remittances of small amounts through the mails, and believe that the passage of the proposed bill will enable the Post Office Department to meet this demand. I have, therefore, to urge upon you the importance of early and favorable action upon the bill herewith submitted, and earnestly hope that the measure will be passed at this session of Congress.

Protests Coming In.

Although the Postmaster-General's letter only reached the committees a few days ago, the news of its receipt was promptly telegraphed throughout the country, and protests against post check currency in any form are now being received from various sources. Retailers of Hardware, dry goods and general merchandise throughout the West have promptly risen to aid in defeating the measures, and a strong protest has been received from the Legislative Committee of the National Association of Retail Druggists, an organization having a membership exceeding 30,000 scattered throughout the country. The character of these protests may be gathered from the following extract from a memorial forwarded to the committee by the editor of a prominent Western trade journal:

These projects, like the domestic parcels post and the plan to reduce the postage on merchandise from 16 to 8 cents per pound by consolidating third and fourth class mail matter, would severely cripple the retail merchants of the country in their struggle against the great mail order houses that are seeking to monopolize the retail merchandising of the United States. These measures are designed to facilitate the sending of money through the mails, and their immediate effect would be to withdraw enormous sums from local trade channels and divert them to a few large centers, thus disturbing general trade conditions and doubtless in many cases driving local merchants out of business. The retailers do not ask legislative aid in their contest with the mail order houses, but merely for "a fair field and no favor." They do not believe that the conduct of a mail banking system is a proper function of the general government, especially when such an institution would injure many thousands for the benefit of a very small number.

We do not believe that the demand for a post check currency is of such a character that it is entitled to the slightest consideration at the hands of Congress. It has been stimulated by the inventor of the so-called post check currency system, to whom we believe can be attributed no other motive than mere pride of authorship. The bill suggested by the Postmaster-General as a substitute appears to be merely the result of the agitation long kept up by the Post Check Currency Bureau, located at 825 Vermont avenue, Washington, D. C., and managed by paid agents of the inventor of the post check.

A postal currency is no new thing. It was tried for ten years, from 1883 to 1893, and was finally abandoned upon the

recommendation of Postmaster-General Bissell, who in his annual report for the fiscal year 1893 said:

"It has been suggested that the postal notes have outlived their usefulness and should no longer be issued; also that the rates charged for all domestic money orders should be reduced and the form of the order simplified. I believe these changes would be desirable and that the revenues would more likely be increased than diminished thereby."

When the postal note was abandoned the money order fees were materially reduced so as to enable the public to purchase money orders for amounts up to \$2.50 for a fee of 3 cents. This arrangement met all reasonable requirements and there has since been no demand for further facilities except such as has been artificially stimulated.

The Danger Is Imminent.

A serious aspect of the present situation is the fact that both the consolidation plan and the post check currency project are likely to be acted upon within a few days. In fact, the consolidation plan will probably be passed upon by the Senate committee before the end of the present week. Will the officers of the Hardware associations who have given so much time and thought to catalogue house competition meet this emergency as it should be met or will they wait to lock the barn door until after the horse is stolen? Not even the passage of a thousand resolutions of regret at the action taken by Congress will have the slightest effect upon the result if they are passed after the pending bills are favorably reported. There is only one way to kill them, and that is for every retailer in the Hardware business to telegraph and write to his own Congressman, to the two Senators who represent his State and to Chairmen Penrose and Overstreet of the Senate and House committees.

When Congress has passed laws reducing the cost of sending merchandise through the mails one-half and providing facilities by which every farmer in the country can send all his money away from home it will be too late for the Hardware dealers to protest. W. L. C.

RAYMOND MFG. COMPANY.

THE RAYMOND MFG. COMPANY, LIMITED, Corry, Pa., manufacturer of Wire Springs and Specialties, has just moved into its fine new factory, which was built to accommodate its rapidly growing business. The plant consists of a three-story brick building of heavy mill construction, containing the manufacturing and shipping departments and offices, and a one-story fireproof building containing the nickeling and japanning rooms and power plant. The entire plant is built with a view to convenience, permanence and safety from fire. Fire doors separate the various departments and each floor is provided with standpipe and hose connected to the city water line, carrying 100 pounds pressure. Power is supplied by a 65 horse-power Ajax tandem gas engine, belt connected to a 45-kw. Crocker-Wheeler 250-volt generator, supplying both light and power. The larger machines are driven by individual motors, and smaller machines are grouped and driven from short line shafts. The plant is steam heated by low pressure direct system. Washrooms and closets are provided for the men on each floor, also a recreation and reading room for use during the noon hour. The company manufactures Wire Springs for agricultural implements, gas engines, automobiles; in fact, for all kinds of machinery, also Bicycle Saddle Springs, Brake, Pole and Trace Springs, &c.

NEAL-CHALLEN-SCOTT COMPANY.

THE NEAL-CHALLEN-SCOTT COMPANY, temporarily at 48 Warren street, as announced in these columns last week, has secured the store floor at 81 Warren street, 25 x 80 feet, where the business will be permanently established at once. This will give the proprietors suitable space for carrying a stock of Hardware, Tools, Specialties and supplies in certain lines, which will be augmented and increased as the business develops. The proprietors, who are all men of wide experience in the trade, will give close personal attention to the execution of orders, which so far as is possible will be shipped on day of receipt. We are assured by Bernard B. Neal, the efficient and resourceful president of the company, that it is fully prepared to receive and execute such orders as it may be favored with.

PRODUCTION OF CUT AND WIRE NAILS IN 1905.

THE statistics compiled under the auspices of the American Iron and Steel Association show that the production of Wire Nails in 1905 amounted to 10,854,892 kegs of 100 pounds, as compared with 11,926,661 kegs in 1904, a decrease of 1,071,769 kegs, or almost 9 per cent. Of the total production in 1905, 7,175,418 kegs were made by the United States Steel Corporation and 3,679,474 kegs by independent companies, as compared with 7,998,912 kegs by the corporation and 3,927,749 kegs by independent companies in 1904. The following table gives the production of Wire Nails by States in 1904 and 1905:

States.	Kegs of 100 pounds.	
	1904.	1905.
New Hampshire, Massachusetts, Rhode Island and Connecticut.....	247,157	264,024
New York, New Jersey and Pennsylvania.	4,869,401	4,504,376
Maryland, Kentucky, Alabama and Ohio.	3,124,624	2,861,587
Indiana and Illinois.....	3,033,756	2,531,774
Michigan, Wisconsin and Colorado.....	651,723	693,131
Totals.....	11,926,661	10,854,892

The Wire Nails produced in 1905 were all made of steel and were turned out by 54 works in 16 States, as compared with 56 works in the same number of States in 1904.

The Production of Cut Nails

and Spikes cut from plates in 1905 was 1,357,549 kegs of 100 pounds each, against 1,283,362 kegs in 1904, an increase of 74,187 kegs. The following table gives the production of Cut Nails and Cut Spikes by States in 1904 and 1905, Iron Nails being separated from Steel Nails for the latter year. Of the total production in 1905 a little over 32 per cent. was cut from iron plate and almost 68 per cent. from steel plate:

States.	1905.—Kegs of 100 pounds.			1904.
	Iron.	Steel.	Total.	
Pennsylvania	345,076	412,331	757,407	698,326
West Virginia and Indiana	210,345	210,345	245,997	
Massachusetts and Ohio.....	158,113	158,113	182,981	
Maryland, Virginia, Kentucky, Illinois, Wisconsin and California.	89,503	142,181	231,684	156,058
Totals.....	434,579	922,970	1,357,549	1,283,362

Ten States made Cut Nails in 1905, as compared with 11 in 1904. Pennsylvania, Virginia, Ohio and Illinois increased their production in 1905, as compared with 1904, but Massachusetts, Maryland, West Virginia, Kentucky, Indiana and California decreased their production.

Ten Years' Comparison.

The following table gives the production of Iron and Steel Cut and Wire Nails in this country in the last ten years in kegs of 100 pounds. The excess of Wire Nails over Cut Nails in each of the ten years is also shown:

Years.	Cut nails.	Wire nails.	Total.	Wire nails over cut.
1896.....	1,615,870	4,719,860	6,335,730	3,103,990
1897.....	2,106,799	8,997,245	11,104,044	6,890,446
1898.....	1,572,221	7,418,475	8,990,696	5,846,254
1899.....	1,904,340	7,618,130	9,522,470	5,713,790
1900.....	1,573,494	7,233,979	8,807,473	5,660,485
1901.....	1,542,240	9,803,822	11,346,062	8,261,582
1902.....	1,633,762	10,982,246	12,616,008	9,348,484
1903.....	1,435,893	9,631,661	11,067,554	8,195,768
1904.....	1,283,362	11,926,661	13,210,023	10,643,299
1905.....	1,357,549	10,854,892	12,212,441	9,497,343

Exports and Imports.

In 1905 our exports of Cut Nails and Cut Spikes amounted to 17,674,099 pounds, equivalent to 176,741 kegs of 100 pounds, against 20,772,049 pounds, or 207,720 kegs, in 1904. Our exports of Wire Nails in 1905 amounted to 80,273,411 pounds, or 802,734 kegs, against 73,455,365 pounds, or 734,554 kegs, in 1904. In 1905 the total imports of Cut Nails and Cut Spikes amounted to 27,272 pounds, or 273 kegs, against 70,125 pounds, or 701 kegs, in 1904. The imports of Wire Nails in 1905 amounted to 53,769 pounds, or 538 kegs, against 42,954 pounds, or 430 kegs, in 1904.

Healy & Wyman, East Boston, Mass., have incorporated under the style of Healy & Wyman Hardware Company.

SAN FRANCISCO HARDWARE AND METAL TRADE.

THE San Francisco Hardware and metal houses mentioned herewith have asked *The Iron Age* to give publicity to the following announcements, as relating to the recent great disaster there. It will be noticed that there are requests for trade literature in some instances in the way of catalogues and price-lists, all of which, including samples, will be especially acceptable now to all such merchants, whether they have found time or means to request them or not. In view of the distance for communications and goods to travel anything that will lighten labor and hasten material and information must necessarily be helpful:

DUNHAM, CARRIGAN & HAYDEN COMPANY, now temporarily located at 131 Kansas street, San Francisco, request that "as all of our factory order books have been destroyed and we have no means of accurately knowing with whom we have orders outstanding, we request all manufacturers who have orders from us to hurry them forward with greatest possible dispatch and to send us by mail copies of all such orders. We also request that all manufacturers send us duplicate (2) copies of all invoices issued to us since January 1, 1906."

BAKER & HAMILTON, whose house in Sacramento, Cal., is unimpaired, ask that "manufacturers having unfilled orders from San Francisco house mail copies of such to Baker & Hamilton, Sacramento, addressed 'Eastern Order Department'; also to mail duplicates of invoices and manifests relating to all shipments made since January 1 last."

W. W. MONTAGUE & Co. have established themselves temporarily at Oakland, Cal., and are going ahead with their business plans as fast as the conditions warrant, shipments to branch house in Los Angeles, which was not injured, continuing the same as before the earthquake.

HOLBROOK, MERRILL & STETSON have opened temporary quarters likewise at Oakland and are energetically getting things into shape.

PACIFIC HARDWARE & STEEL COMPANY, whose great establishment was first occupied last August, some distance toward the suburbs, although menaced by fire all around, was injured, we are advised, to the extent of a few thousand dollars only, by the bursting of a water tank. The company officials, in addition to a heavy stock on hand, are trying to get increased quantities of stock out there to meet the great requirements of the Pacific Coast, hurrying shipments and largely increasing their orders.

BENNETT BROS., San Francisco, advise us that they have started in business again at 541 Haight street, and would like all manufacturers to send at once catalogues and price-lists, addressed as above.

H. A. HEPPNER & Co., Portland, Ore., manufacturers' agents in Iron, Steel, &c., wire us to the effect that manufacturer's selling agencies affected by the San Francisco disaster can operate through them without charge until re-established.

JOSEPH M. HOTTEL, who for a number of years has represented the Black Diamond File Works, Philadelphia, in the Southern States, New England and the lower provinces of Canada, resigned April 12 to accept the vice-presidency of the Carver File Company, Delta File Works, Philadelphia. Mr. Hottel will have charge of the general sales of the company and will give his particular attention to the trade in the above territory.

The Kerscher-Lindemann Company has been incorporated at Manitowoc, Wis., to conduct a Hardware business. The new company is an outgrowth of the business heretofore conducted by Kerscher Brothers. The incorporators are Anton E. Kerscher, Gustav Lindemann and Edward Kerscher.

Hardware Associations.

Arkansas Retail Convention.

The Executive Committee of the Arkansas Retail Hardware Association has selected June 5, 6 and 7 as the time for the seventh annual convention at Little Rock. The headquarters will be at the Gleason Hotel, and present indications promise the largest attendance at any meeting yet held by the organization. The membership of the association has been largely increased during the past year, much of the credit for which is due to the efforts of the salesmen who travel the State, who at the last convention were admitted as associate members. Chas. E. Taylor of Little Rock is secretary of the Arkansas Association.

Oklahoma and Indian Territory Convention.

The Oklahoma and Indian Territory Retail Hardware, Implement and Vehicle Dealers' Association will hold its annual convention in Oklahoma City on July 10, 11 and 12. A large and representative attendance of merchants is expected, and the meeting promises to be the most important and successful in the history of the association movement in the two Territories. Efforts are making to induce manufacturers to make exhibits during the continuance of the convention. W. G. Johnson, Oklahoma City, is secretary of the association.

Oklahoma City Hardware and Manufacturers' Club.

The Hardware, Implement, Vehicle and kindred interests of Oklahoma City, Okla., have for some time been considering the question of forming a semisocial organization. At a meeting held on the 25th ult. a formal organization was perfected under the name of the Oklahoma City Hardware and Manufacturers' Club. The following officers were chosen: President, C. W. Rathbun, manager of the Oklahoma City branch of the Columbus Buggy Company; vice-president, J. R. Van Cleve, manager of the Oklahoma-Moline Plow Company; treasurer, Charles H. Anderson, secretary of the E. M. Jones Saddlery Company; secretary, W. E. Campbell of the Oklahoma Traffic Association; Executive Committee: John E. O'Neill, manager of the Richards & Conover Hardware Company; A. L. Gartside, secretary and manager of the Curtis & Gartside Company, and T. C. Ham of the American Steel & Wire Company.

The following concerns have already joined the club or have the matter under consideration: E. M. Jones Saddlery Company, Excelsior Stove & Mfg. Company, Richards & Conover Hardware Company, J. I. Case Threshing Machine Company, International Harvester Company, Oklahoma-Moline Plow Company, Columbus Buggy Company, Curtis & Gartside Company, Miller-Tooley Tin & Woodenware Company, Oklahoma City Hardware Company, Crane Company, Kingman-Moore Implement Company, Ham & Egleston (American Steel & Wire Company), B. F. Avery & Sons, Reeves & Co., Northwest Thresher Company, Oklahoma Sash & Door Company, Oklahoma Motor Car Company, Oklahoma Furniture Mfg. Company, Geiser Mfg. Company and the Oklahoma City Packing Company.

As Oklahoma City is now an important jobbing point it is believed that an organization of this kind, where the members can come together and discuss trade conditions throughout Oklahoma, Indian Territory and the panhandle of Texas generally, will accomplish a great deal of good.

The club will also co-operate with the retail Hardware, Implement and Vehicle merchants of the two Territories in securing better train service, freight rates, &c., and in making their three days' convention in Oklahoma City on July 10, 11 and 12 a success.

THE WRIGHT & WILHELMY COMPANY, Omaha, Neb., is increasing the size of its main warehouse by the erection of an L-shaped addition and a supplementary story, which brings the size of the building to 132 x 132 feet, six

stories and basement. The old building was 66 x 100 feet. The new building will provide over 47,000 square feet additional floor space, which is an increase of over 63 per cent. compared with present quarters. In addition to this main building the company occupies two separate warehouses, having a combined floor space of 34,800 square feet, but on the completion of the present extension about May 15 all goods will be transferred to the main building, enabling the company to do business under one roof.

DEATH OF GEORGE E. DANA.

GEORGE EAMES DANA of the Whitman & Barnes Mfg. Company died in Syracuse, N. Y., on the 18th ult. The funeral services were held on the 21st ult. at the May Memorial Church, of which Mr. Dana was a trustee and for several years president of the board.

Mr. Dana was born in Lowell, Mass., on February 5, 1834. He entered Harvard in 1850 in his 16th year and was graduated four years later. Then he began the study of law, as was the custom in those days, when a man with a Harvard degree felt compelled to become a lawyer, a doctor or a clergyman. But the sudden breaking down of his father's health forced Mr. Dana to relinquish his plans and turn his energies to assisting in the management of his father's large business. There he remained until soon after the outbreak of the Civil War. After leaving the army Mr. Dana went to Syracuse and at once became known as a man of unusual ability and unswerving integrity. In business circles he held many high places of trust and power, being first secretary of the Whitman & Barnes Mfg. Company, then its vice-president, and in 1899 its president, which position he held for three years. He was then elected chairman of the Board of Directors and a member of the Executive Committee, which offices he held at the time of his death.

He was also a director of the State Bank of Syracuse, a trustee of the Trust & Deposit Company, a director and one of the incorporators of the Solvay Process Company and of the Tully Pipe Line Company. He was a member of the Citizens' Club, the Century Club and a director of the University Club, besides being the president of the Harvard Club of Syracuse. He was also a member of the University Club of New York and of the American Academy of Political and Social Science of Philadelphia. For a number of years he was a member of the Board of Police Commissioners of Syracuse and during part of the time president.

P. & F. CORBIN'S NEW CATALOGUE.

P. & F. CORBIN, New Britain, Conn., and 11 and 13 Murray street, New York, have just begun the distribution of their new illustrated catalogue of Hardware. It is a noteworthy example of high grade work throughout, both in compilation and the mechanical details of illustration, paper and printing. Facing the title page is a large engraving of the P. & F. Corbin factories at New Britain. An important feature of the book is the comprehensive system of numbering the large lines of Art Hardware for inside trim, the system now in force indicating besides the article number, the style and finish also, instead of being entirely arbitrary. There are about 1100 pages in all, each 9 x 12 inches, and the book is substantially bound in half leather. For convenience in quickly locating the contents there are several indexes, the numerical index covering 35 pages, with five columns on a page, giving every number in the book in consecutive order, with the page on which it appears. The alphabetical index, in double columns, covers eight pages. Then there are two pages of index to designs, an equal number for the index by school and one page describing the many finishes. The cuts used in the catalogue range from full to one-half and one-third size, according to the character of the goods. In the catalogue there are no prices whatever, although adequate space with the proper headings is left for the possessor of the book to fill in plainly or in character if desired. Accompanying the catalogue is Price Book No. 1, divided into 12 sections and properly indexed, giving list prices on everything.

The Hardware Store of Neal & Brinker Company.

FIFTH ARTICLE.

COMPARTMENTS of the shelving referred to in previous articles describing the Hardware store of Neal & Brinker Company, New York, are subdivided with much care, pains being taken to economize space in accommodating the different lines of goods which they contain. Oftentimes the removal of a sample board will disclose two or more shallow drawers or trays having

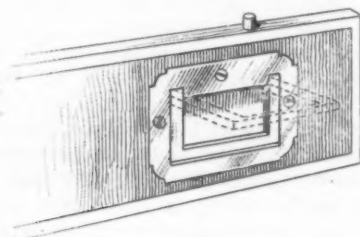


Fig. 28.—Flush Drawer Pull, Used on Drawers Behind Sample Boards.

flush Drawer Pulls, one of which is illustrated in Fig. 28. Projecting Pulls would prevent the board from fitting snugly against the trays and would thus cause the waste of considerable room. Fig. 29 indicates the method of accommodating Socket Firmer Gouges, the sample board being removed and placed on the ledge and one of the

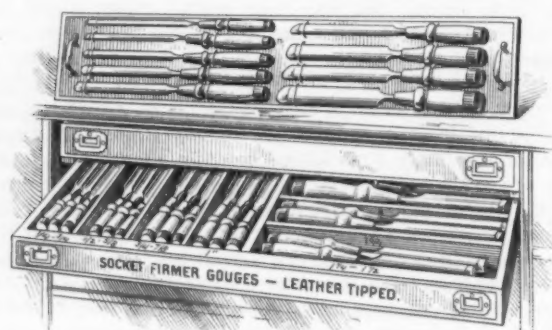


Fig. 29.—Compartment Drawers Containing Socket Firmer Gouges, with Sample Board Removed and Placed on Ledge.

drawers being opened to show the compartment divisions, each marked with the size of the tools contained. In this case part of the drawer is divided into transverse compartments and the balance into compartments running lengthwise, making room for the larger sizes of tools. A

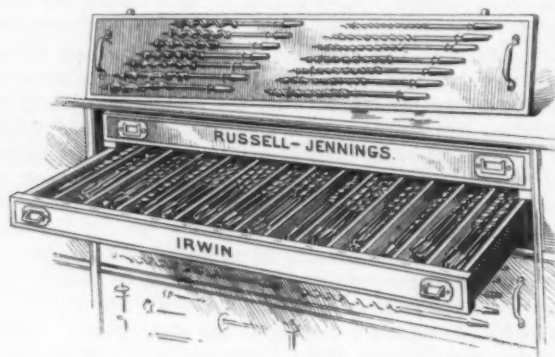


Fig. 30.—Auger Bits in Transverse Compartments, with Sizes from 3-16 to 16-16 Marked on Edge of Drawer.

similar section containing Auger Bits is shown in Fig. 30, although in this case the compartments all run crosswise. The open drawer is 34 inches wide, 12 inches deep and 2½ inches high. It is divided into 14 sections, each containing one size Bit, ranging from 3/16 to 15/16, the sizes being

marked on the front edge of the drawer. Fig. 31 shows a drawer devoted to Car Bits, which, because of their length, require compartments running lengthwise. These are 2½ x 34 inches and have the size marks on the side edge, as shown in the cut. In the front compartment is

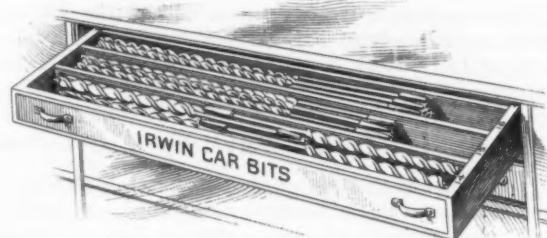


Fig. 31.—Method of Accommodating Car Bits.

also illustrated the method of placing bits end to end, with their thin parts overlapping, thus increasing the capacity of the compartment. The method of accommodating Forstner Auger Bits and Expansive Bits is shown

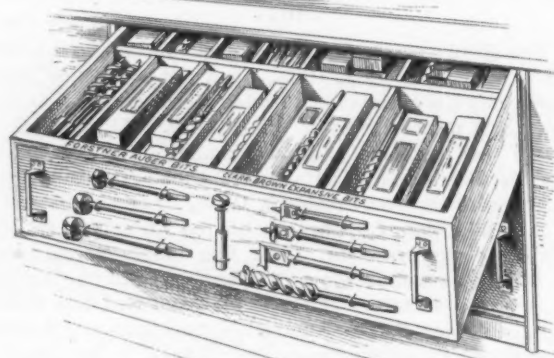


Fig. 32.—Drawer Subdivided for Auger and Expansive Bits, Loose and in Original Boxes.

in Fig. 32. The drawer is 34 inches wide, 24 inches deep and 8 inches high and is divided into 12 sections, each 12 inches long and varying in width from 2½ to 7½ inches. The smaller sections contain the Auger Bits and the

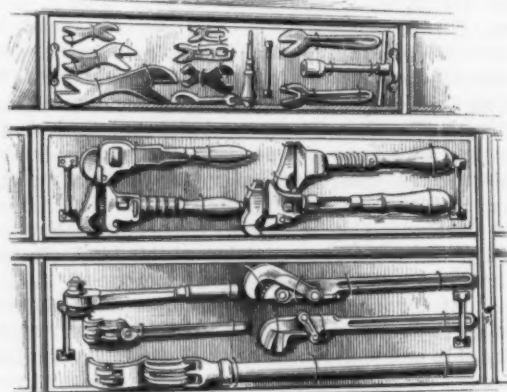


Fig. 33.—Sample Boards Fronting Bins in Which Wrenches Are Kept.

larger ones the Expansive Bits, most of the goods being kept in original boxes, as indicated. In Fig. 33 are illustrated some of the compartments containing Wrenches.

These samples, being heavy, must of course be securely fastened to the boards with strong wire. They are kept in the ledges below the shelving, the compartment at the bottom of the picture being on a level with the floor. In this way no strain is put upon the lighter partitions, and larger space is secured for accommodating long and ponderous tools, the depth of the two lower bins being 24 and 26 inches, respectively.

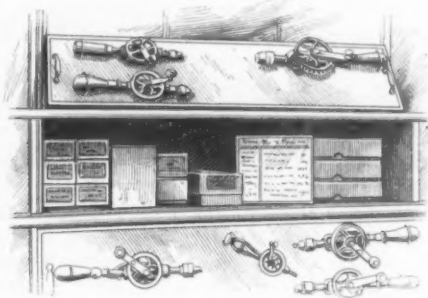


Fig. 34.—Samples of Hand Drills, with Stock in Boxes and Price Card.

Sometimes more or less bulky goods are kept in undivided compartments, in such cases usually remaining in their original cardboard boxes. Such a line is Hand Drills, Fig. 34, the cut showing one sample board removed, thus disclosing the compartment containing goods

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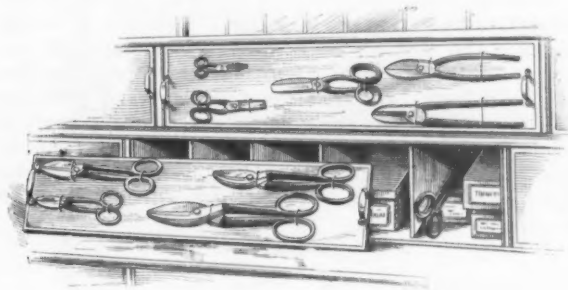


Fig. 35.—Tinners' Shears and Snips.

in boxes, together with price card. Fig. 35 illustrates the compartments devoted to Tinners' Shears and Snips. One sample board is removed, showing how the space is divided into bins containing stock, both loose and in boxes. The samples are attached to the boards with strong wire loops.

(To be continued.)

HAMDEN MFG. COMPANY.

J. E. WATSON has been elected treasurer of the Hamden Mfg. Company, Wallingford, Conn., manufacturer of Ives Auger Bits and other boring implements. Mr. Watson has purchased an interest in the business, and after spending a month or so at Wallingford to post himself on the factory end of the business will return to New York and open an office for the sale of the company's products. Mr. Watson entered the office of Hammacher, Delius & Co., New York, American exporters and commission merchants, whose European houses are in Hamburg and Christiania, 25 years ago as office boy, working up to the position recently occupied, and is thus peculiarly fitted for looking after the export part of the company's business as well as for the domestic trade.

THE business formerly carried on under the name of Wilkinson & Hackett, at Temple Court, 5 and 7 Beekman street, New York, has been dissolved by mutual consent. J. B. Hackett has taken the control and sale of Grate Bars, &c., made by the New England Roller Grate Company, including New England Roller Grates, Skating, Dumping, Stationary and Circular Grates, and will be pleased to attend to anything in that line or pertaining to boiler room equipment.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

ADVERTISING THAT LOOKS LIKE READING MATTER.

BY H. A. JOHNSON.

"The editors of our newspapers do not seem to be very well pleased with changing our ads. so often as once a week, and in setting up ads. which look like reading matter rather than the big typed kind, which they (the editors) claim are not read as much as the large typed kind."

This is an excerpt from a letter recently received from a very energetic Hardware firm in Pennsylvania—energetic, because they know the value of advertising and more particularly the value of frequently changing their ads. The letter is elicited by the fact that they employ a New York Hardware advertising specialist to write their ads. and because the latter's ads. are so different from the old big type ones is the reason that the firm have met with some editorial displeasure at the hands of newspaper publishers.

Now, it is a fundamental principle of advertising, long recognized by those who spend hundreds of thousands of dollars for that purpose, that advertisements to be really efficient

Must Be Changed Frequently;

In fact, the oftener the better. The exceptions to this are those firms who advertise merely to keep their name before the public. But those who advertise to sell goods and who look to the advertising to create the purchasing desire of itself—they are the ones who must frequently change their copy. The announcement:

JOHN JONES & CO.

Offer Shoes for Sale

will not be nearly as efficacious as the advertisement (note the discriminating term):

To make room for spring goods we have a few hundred pairs of women's shoes—all sizes, all high grade goods—which we propose to dispose of at \$1 per pair while they last.

JOHN JONES & CO.

In the first case the announcement states a generality which is seasonable the year around, while the second case advertises a fact which can last only till the shoes are gone. The first is the style of bygone years before the business world awoke to the real developing power of competition. To-day the man who advertises properly makes his advertising new and newsy.

The News of a Store

is the freshest kind of news. So long as men make money and women spend it news from any kind of a store will be eagerly read, for no matter what kind of a store it be there will be those who will be interested.

I say above that advertisers who spend hundreds of thousands of dollars for advertising know the most about it. Money buys experience, and when we see such large advertisers using a certain kind of advertisement, changing it daily, we may depend upon it that these advertisers have paid money for their experience. If they realize the value of changing ads. frequently can we not believe that that idea is profitable? And may we not pattern after them in safety? No department store allows its advertisements to run the same copy day after day. No, indeed; the copy is changed every issue. Isn't that an example worth emulating? The vast changes that have been wrought in business methods have been due in a large degree to the energy of advertising and the frequently changed copy has done it. And I say unequivocally that the publisher who is prejudiced against allow-

ing his advertisers to change their copy frequently is in an old-time rut, for his very prejudice shows him to be out of the path of progress, away from even the channels of disseminated information concerning the publishing business. Moreover, he is shown to possess small regard for the success of those who buy space in his paper. Just here the idea protrudes itself as to just how far the publisher has the right to say what an

Advertiser Shall or Shall Not Print

In the space the latter pays for. Of course he can prohibit his columns being used for slander or libelous purposes, he may deny the right to print advertisements upside down, &c. In the case of the letter I quote the publisher saw fit to dissuade the advertiser from using a style of copy that is regarded as a most successful kind. It was advertising that looked like reading matter, and the editor claimed it wasn't read as much as it would be were it in big type. Let us again have recourse to successful advertisers for reasons of illustration. We may or may not approve of such things as Grape-nuts, Postum Cereal, Peruna, Hood's medicines, Ayer's proprietary remedies, &c., *ad infinitum*, but in the advertising world these articles are known to be successfully advertised, and methods used in these cases are conceded to be successful. Now these advertisers use reading matter. No big, black type for them, excepting as headings. They give some kind of a story, usually rather interesting, which they work in a reference to or a testimonial for their goods they want to sell. Advertising such as this is good advertising, especially when it tells an interesting story. True, it won't interest everybody, but it is not expected to. It is planned to interest a few, and constantly adding to those already interested means a growth of any business, Hardware not excepted. But it is to be noted that it looks like reading matter.

But the publisher above referred to thinks advertising resembling reading matter is not read. How then can we account for the success of the firms who employ that style to the exclusion of all others?

This Style of Copy Is Successful

and for just this reason: We all learn to read from small type, therefore we go through life with a sort of second nature feeling regarding our reading. If, in reading a publication, our eyes behold matter set in small type, we instinctively feel it to be news matter and the chances are we read it. But if, glancing down the page of a newspaper, for instance, we see big type, the kind that shows itself even when our eyes have not yet focused upon it, we feel by instinct that it is advertising, and many people look no farther. That is basic truth and explains the reason why big advertisers have adopted the reader style of copy. They have proven that more people will read that kind of advertising, and their business success proves beyond cavil that that style of advertising can be made to contain more argument, more reason why their article should be bought, more conviction that must precede a sale of any sort.

The development of advertising along scientific lines has brought an interesting transformation in the form and character of advertising. The most approved method now is to put

A Plain Truth in a Plain Way

that the plain people can understand. Recently one of the best known advertising specialists in the country was commissioned by a large house to prepare a catalogue of its Paints. In going through the list of Paints he came to what was called "Yellow Ochre, No. 6." "What's this?" he asked, "what kind of Paint might this be?" "Well," was the reply, "to tell you the truth, we don't say much about that kind. It isn't real good Paint. However, we make it—and there you are. Just tell them it is an elegant thing, and let it go at that." Now, the catalogue man who had this particular book in charge was a convert to the new theory of telling the truth in copy, and when he submitted his manuscript to the officials of the company employing his services they found the following under the heading of "Yellow Ochre No. 6:" "This is bad paint, just about as bad as bad paint can be. We

don't even put our name on it—it isn't fit. The only reason we make it is that we are suppliers of the trade, and there is an occasional demand for a cheap, time-serving paint for outhouses, back fences and the like, and that is the only excuse we have for making it. It costs so and so." The paint house protested against this, went right up into the air, and said: "Here, where do you suppose we'll get off if we publish this statement in our catalogue?" The answer was: "Gentlemen, if you tell the truth about this bad paint you don't care anything about the people will certainly believe this particular statement—more than that—they will believe your other statements contained in this catalogue, where you say that something else is good paint." And there the specialist stood his ground until the paint house finally yielded, and the result was that it sold something like a dozen times more of the Yellow Ochre No. 6 than it ever did before. Painters wrote in, saying: "I have got an old barn I want to paint. I guess that Yellow Ochre No. 6 will do me. Send me two barrels," &c.

Unprogressive.

And so it seems to me that any editor or publisher who sees fit to condemn a style of advertising does so at a risk. By so doing he certainly proves himself to be unaware of the progress in a business which by the natural order of things he ought to be thoroughly posted about. There was a time when to be remote from metropolitan centers was synonymous with being poorly posted as to what was going on, but printer's ink has eliminated distance and man everywhere can follow the news of his business. I believe a weekly change of advertisement to be a prime necessity of business, as I also believe in the reader style of advertising. Last but not least I firmly believe that any man who pays for the space he advertises in has the full right and privilege of determining what shall be printed therein, and so long as his copy is clean it is none of the newspaper publisher's business. In accepting the advertiser's money the publisher subsidizes his paper to the will and wish of him who pays the bill.

GARDEN TOOL ADVERTISEMENT.

THE advertisement reproduced herewith has been used with effective results by a retail Hardware firm. It follows the reading matter style which often secures attention when announcements in big display type would fail to hold the eye. Some of the heaviest advertisers

It's Time To Get Busy In the Garden.

The reappearance of the robins shows that it's time to prepare the soil for flowers and vegetable gardens. Why do the robins prove this? Simply because robins feed on earth-worms, and these worms cannot get to the surface so long as there's frost on the ground. Therefore, when the worms can get on top of the warming ground the frost is gone, the robins are happy, and it's garden making time. To "make garden" the soil must be softened by spading, and it ought to be enriched. To do this one needs a Spading Fork, a Hoe, a Rake, a Trowel and maybe a Wheelbarrow. The right tools make gardening easier and more enjoyable, and, too, they make better garden. A good healthy garden is but the reflection of the care expended in its making. My garden tools are guaranteed to make good gardens. My stock is ample, and the tools are inexpensive. Phone me, if you're too busy to call—I'll do the rest.

ENTERPRISE & CO.,
Springtime, N. Y.

in the country are now employing this method of publicity. The ad. shown tells its story in a seductive and straightforward fashion, and while no prices are mentioned it certainly is an effective reminder both of the garden and of the store which is ready to supply the tools needed for developing the flowers or vegetables of the garden.

NEW JERSEY CATALOGUE.

A. M. MATTHEWS & CO., Orange, N. J., have lately issued a catalogue 7 x 10 inches in dimensions, and while it comprises but 30 pages quite a number of

tribute goods, but create demand for them. The jobber and retailer, in order to do their share in combating this competition must either become more than mere distributors or be satisfied with the profit that distribution merits. It is accordingly necessary that jobber and retailer alike realize the importance of creating a market for a manufacturer's goods and keeping down as low as possible the manufacturer's cost of opening up the distribution channel. Merchants, especially the retailer, are therefore urged to use all the local means in their power—newspaper advertising, attractive window displays, neat and well-arranged stores, &c.—to create demand for the goods which they have to sell. Just so far as they fail to do this, it is submitted, they forfeit the right to the manufacturer's help and protection.

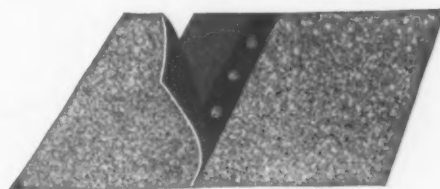
The other booklet, on maintenance of prices, presents some arguments designed to convince merchants of the soundness of the policy of the company in maintaining fixed minimum wholesale and retail prices on its Sad Iron Product. It is stated that merchants generally approve of established prices, and appreciate a policy which assures them profit both by themselves adhering to the fixed prices under all circumstances and seeing that others do likewise. It is incidentally pointed out that the courts have determined that the manufacturer of a patented article has a right to establish and maintain arbitrary prices on his product, and extracts from several decisions are cited.

Wells Bros. Company.

Wells Bros. Company, Greenfield, Mass., is now making burring tools with spiral flutes instead of straight flutes, and has increased its assortments. The company has heretofore furnished its screw plates with adjustable tap wrenches, but a wrench with flat steel jaw manufactured by the company, and in its opinion superior to the adjustable one, is now furnished with the screw plates. The wrench is furnished with the knurled handle and mottle finish which is a feature of the company's Little Giant goods. The wrenches are drop forged and the jaws made of the best tool steel.

Security Brand Asphalt Roofing.

The National Roofing Company, Tonawanda, N. Y., is manufacturing the Security brand asphalt roofing, the special feature of which is the 6-inch welded joint, which is illustrated herewith, the cut showing the 2-inch ungraveled marginal edge and the 4-inch extension of felt



Welded Joint in Security Brand Asphalt Roofing.

used in making the joint. This joint is made by a patent process and no nails are driven through it from the top but only through the lower felt, the nail heads being covered by the upper sheet in making the joint. The company states that its patent not only covers the manufacture of the joint on the roofing but also the making of the joint on the roof as material is applied and the process used in welding the sheets together.

Wagner Roof Bracket.

The Wagner roof bracket No. 40, shown in the accompanying cuts, is the product of the Wagner Mfg. Company, Cedar Falls, Iowa. It is made of steel, black japan finish, and will take in a 2 x 6 inch timber. In Fig. 2 is shown a section of roof shingled and also one not shingled,

24 CATALOGUE A. M. MATTHEWS & CO.

Cork Screws,
5c to \$1.25.

Dust Pans,
10c to 25c.

Refrigerator Pans,
25c up.

Sink Shovels
5c and 10c.

Coal Sieves
Square 10c up.
Rival 65c.

Sink Brushes.
Heather, 3 and 5c.
Y. R. 10c.

STOVE POKERS, 10c up.

Cover Lifters,
3c up.

Stove Cleaners.

Fire Shovels.
Short Handled, Japaned,
5c each.
Long Handle, 10c and 15c.
Short Handle, Galvanized,
10c.
Long Handle, 15c.

Furnace Scoops, 75c up.
Iron Shovels for Ashes, Snow, Etc. 40c up.

Coal Hods.
Japaned,
25c up.
Galvanized,
30c up.

Ash and Garbage Cans
Garbage Cans,
45c to \$1.00.
Ash Cans,
\$1.00 to \$3.00.
No. 6 Special,
\$1.50.

Pails, 15c up.
2 Hoop, 15c.
Galvanized, 30c to 40c.
Enamel, 65c.
Wood, 15c to 65c up.

Tin and Enamel Measures.
Tin, 6c up.
Enamel, 30c up.

Wood Measures, 10c up

Funnels, 3c up.

SCOOPS,
3c up.

Ice Shavers, Ice Picks,
Ice Chisels, Ice Axes,
Ice Tongs,
5c to \$1.25.

Page From A. M. Matthews & Co.'s Catalogue Reduced One-Half.

selections from their extensive stock are given through the use of small cuts. A page reduced in size is shown herewith.

CO-OPERATION AND MAINTENANCE OF PRICES.

TWO very interesting and thoughtful booklets have recently been issued by the Dover Mfg. Company, Canal Dover, Ohio, manufacturer of the well-known Asbestos Sad Irons. They are entitled "Co-operation" and "Price Maintaining," and were prepared by O. A. Keyser, the efficient advertising manager of the company. In the booklet on "Co-operation" Mr. Keyser points out the way in which the manufacturers and the trade, jobbers and retailers, can reciprocate to mutual advantage. Emphasis is laid on the importance of treating the manufacturer's salesmen fairly. It is pointed out that there is much to be learned from the intelligent, conscientious salesman which may be used to the merchant's advantage in the conduct of his business. On the other hand it is recognized that some traveling men are unworthy of the confidence or respect of the buyer, but such instances are exceptional. It is the salesman's business to be a bureau of information so far as the line he represents is concerned. On the subject of catalogue house competition, it is pointed out that these houses not only dis-

the brackets being used both for sheathing and shingling. To use for the former purpose nails should be driven into the sheathing and the bracket hooked onto same through the slotted holes at the top. To use for shingling, the upper end of the bracket should be pushed under a



Fig. 1.—Wagner Roof Bracket.

layer of shingles. The teeth on the lower brace, which may be observed in Fig. 1, will then catch and securely hold in the two lower layers of shingles. The timber is prevented from slipping or turning up edgewise by a

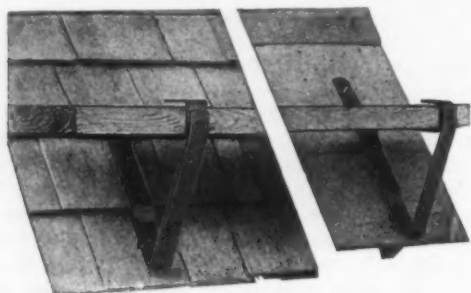


Fig. 2.—Wagner Roof Bracket on Shingled and Unshingled Roof. safety hook at the top of the upper brace. Brackets are packed one dozen in a box, the gross weight of which is 23 pounds.

Natural Double Wing Trout Flies.

Clark-Horrocks Company, Utica, N. Y., is putting on the market a seasonable novelty in trout flies. These flies, two of which are shown in Fig. 1, instead of a single wing have double wings spread out, making an excellent imitation of a natural fly. They are made in all the



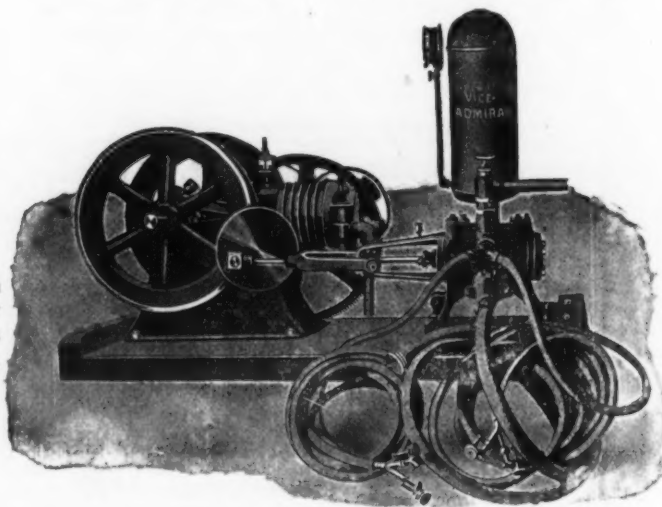
Fig. 1.—Natural Double Wing Trout Flies.

popular wing patterns, and are put up in an attractive partition box for case or counter display, shown in Fig. 2. These boxes contain a gross or half gross of flies, as ordered. The convenience of this method of packing and the attractiveness of the display are expected to appeal

to expert fishermen, as well as to merchants handling fishing tackle.

Goulds' Vice-Admiral Power Sprayer.

The power spraying outfit shown in the accompanying cut is offered by Goulds Mfg. Company, Seneca Falls, N. Y. It consists of a Goulds' Vice-Admiral double acting sprayer, with a Deyo air cooled gasoline engine. The rapidly revolving fan on the side of the engine cylinder forces a current of air about the radiating flanges of the cylinders, keeping them cool. This does away with the



Goulds' Vice-Admiral Power Sprayer.

circulating tank, simplifies the mechanism, removes danger of freezing in cold weather and reduces weight. The engine is referred to as very simple, requiring no engineer to run it, and when not required for spraying can be detached from the pump by removing one bolt from the driving gear. It can then be used for a variety of purposes about the farm. The gasoline tank is in the base of the engine and requires from 1 to 2 gallons per day to run the machine continuously, according to the size of the engine selected. The outfit is said to be of ample capacity for eight nozzles, maintaining a pressure of 125 pounds. It is fitted with a 200-pound pressure gauge and a relief valve that can be adjusted for any desired pressure. Three outfits are furnished, as follows: Outfit L, 2½-inch cylinder, 10 feet 1-inch suction hose and strainer, two 25-foot leads of ¾-inch discharge hose with

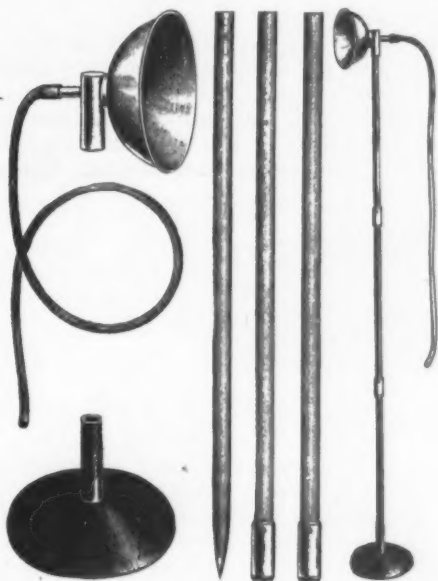


Fig. 2.—Trout Flies in Partition Display Box.

V connection on each, four large Mistry nozzles and 1½ horse-power engine; outfit M, same as outfit L, but with 2½ horse-power engine; outfit MM, with 3-inch cylinder, 10 feet 1¼-inch suction hose and strainer and 2½ horse-power engine.

Crescent Repair Lamp.

A. H. Funke, 83 Chambers street, New York, manufacturer of acetylene lamps, has put on the market the Crescent acetylene repair lamp, here shown. It is designed particularly for repair work around an automobile, although possessing features that make it serviceable for many other purposes that will suggest themselves, including camping, canoeing, &c. The outfit comprises a handsome nickel plated brass lamp similar to Funke's Full Moon lamp in principle, long on the market, a three-piece $\frac{1}{2}$ -inch jointed wood rod, each 14 to 15 inches long, a cast iron japan finished base, $4\frac{1}{4}$ inches in diameter, weighing $1\frac{1}{2}$ pounds, and 10 feet of flexible rubber tubing. Gas is obtained by attaching tube to an acetylene generator carried on the automobile to supply the search light, but for detached service, as in camp, a generator must accompany the lamp. A brilliant, bright light is produced, and from the length of support, 42



Crescent Repair Lamp in Sections and Assembled.

inches, any part of under portion of car can be inspected without necessarily getting under it, except for actual work. Without being heavy the standard has weight enough to keep the lamp steady, so that a light is provided, and the individual with both hands free is unencumbered. One or more sections of the rod can be used, and where the earth is soft the pointed bottom can be thrust into it. The lamp parts are packed in a three compartment wood box, $15\frac{1}{2} \times 5 \times 5$ inches, outside, with slide cover, the large middle compartment having surplus room enough to hold an average tool kit also.

Duff Roller Bearing Ratchet Screw Jacks.

The accompanying cuts represent roller bearing ratchet screw jacks made by Duff Mfg. Company, Allegheny, Pa. Fig. 1 shows the No. 64 jack of 50 tons capacity, with round base 14 inches in diameter, which is strongly ribbed to meet heavy work. The top is $10\frac{1}{2}$ inches across, and contains the distinctive roller bearing, which is claimed to be particularly adapted to its purpose because it is easily operated, long lived, little liable to wear and capable of withstanding the heaviest loads. For low set loads this jack has a foot lift on which one-half its rated capacity may be lifted. The construction of the Duff roller bearing jack is shown in Fig. 2. It is made entirely of refined malleable iron and steel. All gears are made from forgings and have machine cut teeth. The load is raised by means of a crucible machinery steel screw with a special thread, which revolves in a bronze nut set in the top of the base and can be very easily renewed. The load is carried on a large roller bearing which gives the minimum amount of friction with the maximum strength. The thrust on the bevel pinion is taken by another roller bearing, a feature peculiar to this

screw jack, making it very easy to operate. The roller bearings used are said to be the best of their kind, and consist of two hardened ground tool steel plates with a cage between them, carrying the hardened ground rolls. The ratchet is of special construction, involving very few parts. It consists of a malleable cage surrounding the ratchet wheel on the shaft. Within this cage is a tool



Fig. 1.—Duff Roller Bearing Ratchet Screw Jack No. 64.

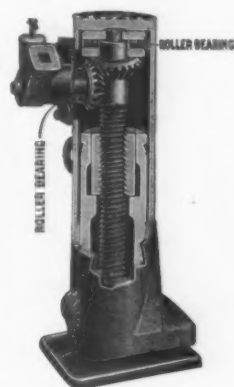


Fig. 2.—Sectional View of Roller Bearing Ratchet Screw Jack.

steel pawl pin which engages the teeth of the ratchet. The direction is changed by pulling this pin out and turning half way round. This allows the pin to engage the ratchet in opposite direction. All parts of these jacks are accurately made to gauges, so that repairs can be made readily if necessary.

Revolving Nail Bin.

The revolving nail bin which is here shown is being manufactured by the Revolving Bin Company, 234 Baird avenue, Chicago. The bin is made in sections, the one illustrated, as will be seen, having four. Each section is hung on finely adjusted ball bearings and is moved independently of every other section. Each section contains five bins, each of which will hold 100 pounds of



Revolving Nail Bin.

nails, bolts, rivets, &c. A side bearing underneath the center cone makes each section turn with practically the same ease, whether loaded evenly or all on one side. The bins are made of annealed sheet steel and are hand riveted. The stem is made of double strength gas pipe. The four-section bin weighs 250 pounds, measures 4 feet across and stands $4\frac{1}{2}$ feet high. Ordinary selling sizes of nails are placed in the bottom sections and rare sellers in the top section. The manufacturer states that the bin is well finished and highly ornamental.

Butler's Patent Hay, Meat, Case and Cotton Hooks.

The hooks here illustrated are manufactured by Thomas Watson, 553-557 West Thirty-fifth street, New



Butler's Hay, Meat, Case and Cotton Hooks.

York. They are made of the best steel, with a shoulder on the end of the shank to fit the malleable iron two-piece socket, shown in the cut. When these are pressed snug into the maple handle it is said to be impossible to

truss frame construction. The corner pins prevent the box shifting on the bottom. The gear is hard wood, well braced forward and back. The front wheels turn under to the center, which permits the wagon to turn completely on a narrow walk. The brake controls speed. The wheels are especially well suited to their use and are of a construction on which a patent has recently been granted. They have a T steel rim of light weight and superior strength. This construction, it is said, permits the spokes to be drawn absolutely tight, thus insuring a true and noiseless wheel. The wagon is handsomely ornamented and varnished and trimmed in bright red.

Traveler Cushion Razor Strop.

The Eddy Mfg. Company, Worcester, Mass., represented by the Smith & Hemenway Company, 296 Broadway, New York, has just put on the market the Traveler Cushion Razor Strop No. 252, trade-marked "Keen Edge," here illustrated. There are two stropping surfaces, red (coarse) and black (fine), the red being about $\frac{1}{4}$ inch thick and the finishing side slightly thinner. A noteworthy feature of the strop is the method of tanning the leather with an oil that keeps the surfaces soft and pliable and impervious to moisture, thus permitting the blade to take hold properly in stropping. The leather



Traveler Cushion Razor Strop with Space for Razor.

pull out the hook, which is guaranteed not to straighten with any ordinary pull or lift. Hay hooks are made of 7-16-inch steel, in two sizes, 9 and 10 inches, respectively, over all. Cotton and meat hooks are made of $\frac{3}{8}$ -inch steel and are 9 inches long. Case hooks are made of $\frac{1}{2}$ -inch octagon steel, 11 inches long. Special shapes and sizes will be furnished, in lots of 500 or more.

Wabash Coaster Wagon.

The Wabash coaster wagon No. 37 is illustrated herewith. It is made by the Wabash Mfg. Company, Wabash,



Wabash Coaster Wagon.

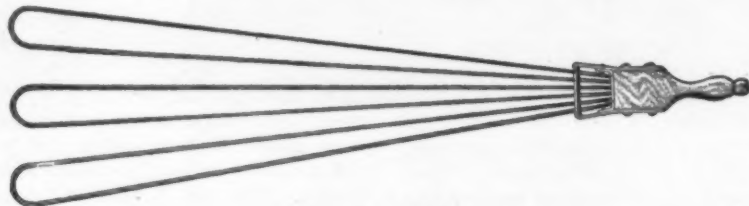
Ind., which describes it as strong, compact and simple. The box is 16 x 34 inches and 5 inches deep. Five hard wood

cushions are mounted on a wood block, varnished natural, in dimensions 9 x 13-16 x $\frac{1}{2}$ inch. The black side is cemented permanently to the block, the red one being pivoted at one end so that it will swing entirely around, if necessary, thus uncovering a recessed razor holding cavity 6 $\frac{5}{8}$ x 1 x 7-16 inch. The 3-16-inch nickeled wire handle, 1 $\frac{1}{2}$ inches wide, when pulled out is 5 inches long, it being locked open by a small spring side button.

Each strop is inclosed in a neat, light cloth-covered case and attractively labeled. The stropps can be sold singly or with razor included, in which instance it is known as the Combination Household and Traveler's Razor Strop Set No. 254. An absolute guarantee is given on the strop, the price of which will be refunded if after 30 days' trial it is not found satisfactory and as represented.

Ideal Carpet Whip.

The Ideal carpet whip, shown in the accompanying illustration and manufactured by the Andrews Wire & Iron Works, Rockford, Ill., consists of three loops made of No. 12 spring steel wire, which are attached to a steel skeleton frame work in such a manner that they cannot be loosened. The wooden handle is shaped to fit the hand and is riveted into the frame with rivets running all the way through. The handle is thus held firmly in place. It is claimed that this whip removes the dust quickly and strikes a large surface with every stroke, doing no dam-



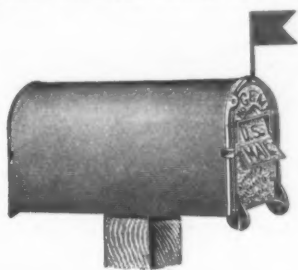
Ideal Carpet Whip.

strips across the bottom give strength; two strap bolts riveted to the sides pass through the bottom and with the middle cross piece with nuts on the bottom end form a

age to the fabric. It is also said to be so hung in the handle as to be perfectly balanced in the hand, thus not straining the wrist of the operator.

Gem No. 3 Rural Mail Box.

The rural mail box here illustrated, styled Gem No. 3, is made by the C. A. Peck Hardware Company, Berlin, Wis., which will market it along with its Gem No. 1 and No. 2 and the Jewel. The new box is described as high grade in every respect, the body being made of No. 20 gal-

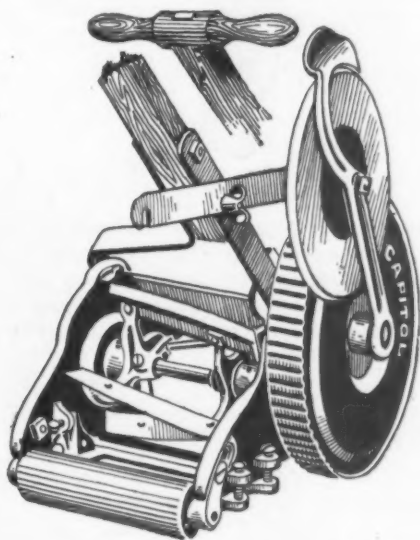


Gem No. 3 Rural Mail Box.

vanized steel and the ends cast and well galvanized. It is painted green, with the letters "U. S. Mail" in red, a combination said to give a pleasing and striking appearance. There is a drop door with friction catch at the top, so that all the carrier has to do is to jerk it open and slam it shut. The door contains an extra large drop letter slot which will accommodate newspapers or small packages.

Capitol Lawn Trimmer and Edger.

The Secrest Mfg. Company, Cleveland, Ohio, is putting on the market the Capitol lawn trimmer and



Capitol Lawn Trimmer and Edger.

edger, here illustrated. For all territory outside the United States and Canada the Granite State Mowing Machine Company, Hinsdale, N. H. (New York office, 84 Chambers street, in charge of J. N. Limeburner), is the exclusive selling agent. It is also the general selling agent for the New England States and the State of New

York. This implement is made particularly for trimming and edging a lawn or any such green sward rapidly. It has four crucible steel blades 6 inches long, which are hardened and tempered in oil, brass bushings and double adjustment. The principal feature is the trimmer, which is said to obviate the use of shears and similar devices for trimming otherwise inaccessible sections, while the shield over the cylinder protects the flowers, thus increasing its value on fine lawns and around flower beds and shrubbery, especially in the case of cemeteries and parks, where its close cutting qualities enable one to cut close to the side of any obstruction. The cutting disk for edging the lawn is of high grade crucible steel, 6½ inches in diameter, and the whole machine is well made and painted in white and gold. In the operation of trimming the edger can be taken up a notch, as shown, out of the way, the side notched bar being caught and held by a wing nut at end of bar when edging, the machine being turned over in this process. The small plow like guard throws the cut material away from the edge, automatically.

Luitink's Adjustable Door Track and Hanger.

Luitink & Sons Mfg. Company, Milwaukee, Wis., is manufacturing the adjustable door track and hanger shown herewith, Fig. 1 being an end view. Either single

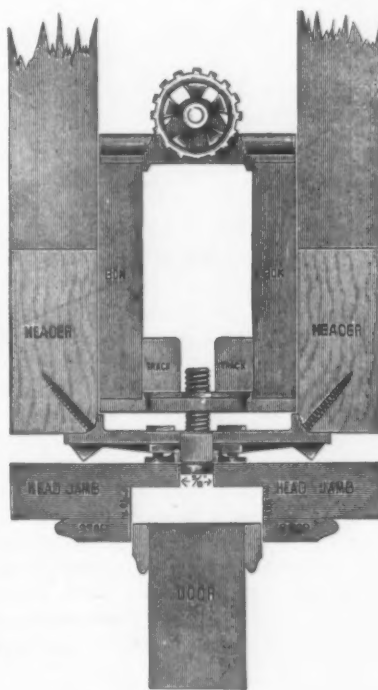


Fig. 1.—Luitink's Adjustable Door Track and Hanger.

or double doors can be used with the track, single tracks being simply half of the track illustrated in Fig. 2. Doors can be hung quickly, it is explained, as it requires but the driving of six screws for a single door, or ten screws for double doors. The box and track of selected material are shipped complete by the makers, and the track is inclosed in a manner to prevent dust or mortar settling upon it. The track can be put up before or after the plastering is done, which permits its use in old as well as new buildings. Planed face double wheels of large diameter are used, with a yoke running over the axle

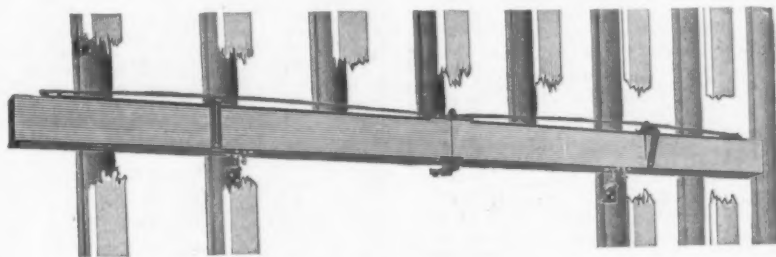


Fig. 2.—Luitink's Adjustable Track.

on an antifriction principle to enable even extra heavy doors to move freely and smoothly. The track is made of maple to obtain a soft, easy and noiseless sliding of the door. The adjustable feature is entirely in the track, the hanger being nonadjustable so as not to get out of order. The track simply rests on bolt heads, supported

on an antifriction principle to enable even extra heavy doors to move freely and smoothly. The track is made of maple to obtain a soft, easy and noiseless sliding of the door. The adjustable feature is entirely in the track, the hanger being nonadjustable so as not to get out of order. The track simply rests on bolt heads, supported

by brackets attached to the jamb studs on each side, and is not fastened at any point. There is a side swing or lateral motion in the hanger, so that the door will not bind, but will always carry plumb. Adjustments in the track, which are as follows, can be made with the use of a screw driver: The track can be raised or lowered; it can be raised or lowered sideways, so as to equalize any uneven settling in the partitions; adjustments of double doors can be made at the center, after which they may be adjusted with the jambs, without interfering with the adjustments at the center, and single doors can be adjusted so that they will be plumb with both jambs.

Baker Double Tooth Saw Sets.

Baker & Foster, 3050-3054 Ludlow street, Philadelphia, Pa., have recently put on the market three styles of double tooth saw sets, as here shown. All, both those for hand and hammer, embody the same mechanical principles, with modifications in the application of power to meet the views of different users. Fig. 1 illustrates the



Fig. 1.—Baker Double Tooth Saw Set with Push Down Lever.

No. 1 style, having the lever at top to be pushed downward in tooth setting. In use there are but two screws to adjust to adapt it to hand or hand saws of every description. An important claim of the makers for this construction is that by this method of setting two teeth simultaneously, one each way, the saw blade is kept straight. When about to set a saw the adjusting screw is moved forward and backward until the projecting bevel on the anvil is in line with one tooth and the projecting point on the plunger is in line with the opposite tooth. For fine tooth saws the gauge is pushed up so that the point on the plunger strikes lower down on the tooth. In setting a saw the start should always be made at the handle, working toward the point of the saw. Fig. 2

illustrates the No. 2 style, with lift up lever, being otherwise exactly the same as No. 1. Fig. 3 reproduces the No. 3 hammer saw set, which is about 7½ inches high over all. The frame is of malleable iron, with malleable bench screw, japan finish. The plunger, of best quality



Fig. 2.—Same Saw Set with Lift Up Lever.

tool steel is 7-16 inch square; and is automatically raised after being struck with a hammer by the spiral steel spring. The three saw sets have a capacity of from 3 to 12 teeth to the inch, inclusive. The working parts in all the sets are said to be of best quality tool steel, properly tempered and guaranteed throughout. The Nos.



Fig. 3.—Hammer Saw Set Embodying Same Principle.

1 and 2 saw sets are polished and put up singly in dove-tailed slide cover wooden boxes, neatly labeled at end and packed six in a case. The No. 3 hammer saw set is packed in pasteboard boxes, and also packed six in a case. The saw sets have been patented in the United States and foreign countries.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—		Miscellaneous—		Blue, Ultramarine.....		Lamp, Com.....	
Linseed, City, raw.....	42 @43	Barytes:.....		Brown, Vandyke.....	11 @14	Blue, Celestial.....	4 @6
Linseed, City, Boiled.....	43 @44	White, Foreign.....	ton \$17.50@19.00	Green, Chrome.....	12 @16	Blue, Chinese.....	4 @32
Linseed, State and West'n, raw.....	39 @40	Amer. floated.....	ton 19.00@	Green, Paris.....	21 @24	Blue, Prussian.....	27 @30
Linseed, raw Calcutta seed.....	45 @46	Off color, No. 2.....	ton 13.50@15.00	Sienna, Raw.....	12 @15	Blue, Ultramarine.....	4 @15
Lard, Extra Prime, Winter.....	71 @72	Chalk, in bulk.....	ton 3.00@3.25	Sienna, Burnt.....	12 @15	Brown, Spanish.....	1/2 @1
Lard, Extra No. 1.....	51 @52	Chalk, in bbls.....	100 lb .@ .35	Umber, Raw.....	11 @14	Carmine, No. 40.....	\$3.30@3.40
Lard, No. 1.....	41 @43	China Clay, English.....	ton 12.00@17.00	Umber, Burnt.....	11 @14	Green, Chrome, ordinary.....	3 1/2 @6
Cotton-seed, Crude, f.o.b. mills.....	30 @31	Cobalt, Oxide.....	100 lb 2.50@2.60			Green, Chrome, pure.....	17 @25
Cotton-seed, Summer Yellow.....	37 @37 1/2	Whiting, Common.....	100 lb .43@.48			Lead, Red, bbls. 1/2 bbls. and kegs:	
Prime.....	37 @37 1/2	Whiting, Ex. Gilders.....	100 lb .50@.56			Lots 500 lb or over.....	@ 7 1/2
Cotton-seed, Summer Yellow.....	37 @37 1/2					Lots less than 500 lb.....	@ 7 1/2
off grades.....	37 @37 1/2					Large, American, bbls.....	@ 7 1/2
Sperm, Crude.....	53 @					Other, American.....	ton \$8.50@16.00
Sperm, Natural Spring.....	53 @					Other, American Golden.....	2 1/2 @3 1/2
Sperm, Bleached Spring.....	53 @					Other, French.....	1 1/2 @2 1/2
Sperm, Natural Winter.....	63 @65					Other, Foreign Golden.....	3 @4
Sperm, Bleached Winter.....	66 @67					Orange Mineral, French.....	10 @12
Tallow, Prime.....	51 @53					Orange Mineral, German.....	8 1/2 @10
Whale, Crude.....	31 @32					Orange, Mineral, American.....	8 1/2 @8 1/2
Whale, Natural Winter.....	38 @41					Red, Indian, English.....	4 @8 1/2
Whale, Bleached Winter.....	40 @42					Red, Indian, American.....	3 @3 1/2
Extra Bleached Winter.....	44 @46					Red, Turkey, English.....	4 @10
Menhaden, Brown, Strained.....	28 @29					Red, Tuscan, Amer.....	7 @10
Menhaden, Light, Strained.....	27 @30					Red, Venetian, Amer.....	100 lb \$0.50@1.25
Menhaden, Bleached, Winter.....	27 @30					Red Venetian, English.....	100 lb \$1.15@1.75
Menhaden, Ex-Bld., Winter.....	27 @30					Sienna, Italian, Burnt and	
Menhaden, Southern.....	27 @30					Powdered.....	3 @9 1/2
Cocanut, Ceylon.....	6 1/2 @7					Sienna, Ital., Raw, Powd.....	3 @6 1/2
Cocanut, Coch.....	7 1/2 @8					Sienna, American, Raw.....	1 1/2 @2
Cod, Domestic, Prime.....	31 @32					Sienna, American, Burnt and	
Cod, Newfoundland.....	35 1/2 @37					Powdered.....	1 1/2 @2
Red, Elaine.....	38 @41					Talc, French.....	ton \$15.00@30.00
Red, Saponified.....	4 1/2 @5					Talc, American.....	ton 15.00@25.00
Olive, Italian, bbls.....	57 @60					Terra Alba, French.....	100 lb 90 @1.00
Nestafol, prime.....	48 @50					Terra Alba, English.....	100 lb 90 @1.00
Palm, Logos.....	6 @6 1/2					Terra Alba, American.....	100
						Do, No. 1.....	70 @80
						Terra Alba, American.....	100
						Do, No. 2.....	60 @65
						Umber, Turkey, Raw & Pow.....	2 1/2 @3 1/2
						Umber, Turkey, Raw & Pow.....	2 1/2 @3 1/2
						Umber, Burnt, Amer.....	1 1/2 @2
						Umber, Raw, Amer.....	1 1/2 @2
						Yellow Chrome.....	12 @14
						Vermilion, American Lead.....	10 @25
						Vermilion, Quicksilver, bulk.....	@25
						Vermilion, Quicksilver, bag.....	@25
						Vermilion, English, Import.....	75 @80
						Vermilion, Chinese.....	\$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 $\frac{1}{2}$ %, @ 33 $\frac{1}{2}$ %, & 10% signifies

that the price of the goods in question ranges from 33 $\frac{1}{2}$ per cent. discount to 33 $\frac{1}{2}$ %, and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1905, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33 $\frac{1}{2}$ %
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvils..... $\frac{1}{2}$ lb 6%
Hay-Budden, Wrought.....9%
Horseshoe brand, Wrought.....9%
Trenton..... $\frac{1}{2}$ lb 9%
Imported—

Peter Wright & Sons..... $\frac{1}{2}$ lb 10%
Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....15%
Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....33 $\frac{1}{2}$ %

Augers and Bits—

Com. Double Spur.....75%
Jennings' Patn., reg. finish.....50%
Black Lip or Blued.....60%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....50%
Ford's Auger and Car Bits.....40%
Forster Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list.....25%
No. 30, R. Jennings' list.....40%
Russell Jennings.....25%
L'Hommiedue Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50%
Ohio Tool Co.'s Bailey Auger and Car Bits.....40%
Pugh's Black Auger Bits.....30%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Wright's Jennings' Bits.....60%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, \$18; large, \$26.....50%
Clark's Pattern, No. 1, $\frac{1}{2}$ doz. \$30.....45%
Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat. 25%
Swan's.....60%

Gimlet Bits—

Common Dble. Cut.....\$3.00@3.25
German Pattern, Nos. 1 to 10, \$1.60; 11 to 13, \$1.75

Hollow Augers—

Bonney Pat., per doz.....\$5.50@6.00
Ames.....25%
Universal.....20%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....\$5.45@5%
C. E. Jennings & Co.:
Watrous.....15%
Ohio Tool Co.'s.....40%
Snell's.....40%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.00
Unhanded, Shlided.....gro. \$2.50@2.75
Unhanded, Patent.....gro. \$2.00@2.25
Peg Awls:
Unhanded, Patent, gro. \$1.50@1.75
Unhanded, Shlided.....gro. \$1.50@1.75
Scratch Awls:
Handled, Com.....gro. \$3.50@4.00
Handled, Socket.....gro. \$11.50@12.00
Hurwood.....40%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights:
First Quality.....\$1.75@5.00
Second Quality.....\$1.25@4.50
Double Bit, base weights:
First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle

Axles—

Concord, Loose Collar.....4%
Concord, Solid Collar.....\$11.50@12%
No. 1 Common, Loose.....\$4@5%

No. 1 $\frac{1}{2}$ Com., New Style.....\$4.45@4%
No. 2 Solid Collar.....40%
Half Patent:
Nos. 7, 8, 11 and 12.....75%
Nos. 13 to 14.....70%
Nos. 15 to 18.....75%
Nos. 19 to 22.....75%

Boxes, Axle—
Common and Concord, not turned lb. 4%
Common and Concord, turned lb. 5%
Half Patent.....lb. 8%
Bait—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20%
Balances—
Caldwell new list.....50%
Pullman.....50%
Spring—
Spring Balances.....50%
Chatillon's:
Light Spg. Balances.....40%
Straight Balances.....40%
Circular Balances.....30%
Large Dial.....30%
Barb Wire—See Wire, Barb.
Bars—
Steel Crowbars, 10 to 40 lb. per lb. 3%
Towel
No. 10 Ideal, Nickel Plate.....\$0.85
Beams, Scale—
Scale Beams.....\$4.10@5%
Chatillon's No. 1.....30%
Chatillon's No. 2.....40%
Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered $\frac{1}{2}$ doz. \$0.85;
Tinned.....\$1.00
No. 11 Wire Coppered $\frac{1}{2}$ doz. \$1.10;
Tinned.....\$1.20
No. 10 Wire Galvanized.....\$1.75
Western W. G. Co.:
No. 1 Electric.....\$0.70
No. 2 Buffalo.....\$0.90
No. 3 Perfection Dust.....\$0.80
Egg—
Holt-Lyon Co.:
Holt, No. 1, Japanned.....\$0.20
Holt, No. 1, Tinned.....\$0.10
Holt, No. 2, Japanned.....\$0.20
Holt, No. 2, Tinned.....\$0.25
Lyon, No. 2, Japanned.....\$0.15
Lyon, No. 3, Japanned.....\$0.15
Taplin Mfg. Co.:
No. 60 Improved Dover.....\$6.00
No. 75 Improved Dover.....\$6.50
No. 100 Improved Dover.....\$7.00
No. 102 Improved Dover, Tin'd.....\$8.50
No. 150 Improved Dover, Hotel.....\$15.00
No. 162 Imp'd Dover, Hotel, T'd.....\$17.00
No. 200 Imp'd Dover Tumbler.....\$35.00
No. 202 Imp'd Dover Tumbler, T'd.....\$39.50
No. 300 Imp'd Dover Mammoth.....\$25.00
Western, W. G. Co., Buffalo.....\$7.00
Wonder (R. M. Co.).....\$0.70, net, \$6.00
Bellows—
Blacksmith, Standard List.....60%
Inch.....6 7 8 9 10
Doz.....\$4.75 5.70 6.65 7.60 8.85
Inch.....9 10 11 12 14
Doz.....\$8.00 9.00 10.50 12.50 14.50
Bells—
Ordinary goods.....75%
High grade.....70%
Jersey.....75%
Texas Star.....50%
Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55%
Lever and Pull, Sargent's.....60%
Trip Gong.....50%
Yankee Gong.....55%
Door—
Hand Bells, Polished, Brass.....60%
White Metal.....60%
Nickel Plated.....50%
Scissors.....60%
Cone's Globe Hand Bells.....35%
Silver Chime.....35%
Miscellaneous—
Farm Bells.....lb. \$4%
Steel Alloy Church and School.....50%
American Tube & Stamping Co. Gongs.....75%
Table Call Bells.....50%

Belting—Leather—

Extra Heavy, Short Lap.....60%
Regular Short Lap.....60%
Standard.....60%
Light Standard.....70%
Cut Leather Lacing.....50%
Leather Lacing Sides, per sq. ft. 25%

Rubber—

Agricultural (Low Grade).....75%
Common Standard.....70%
Standard.....60%
Extra.....60%
High Grade.....50%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, \$1.25; No. 2, \$7.25; No. 3, \$10.50; No. 4, \$16.25; No. 5, \$20.50.
Green River Tire Benders and Upsetters.....20%
Bicycle Goods—
John S. Lang's Son's 1902 list:
Chain.....50%
Forks.....50%
Spokes.....50%
Tubes.....60%
Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.
Blocks—Tackle—
Common Wooden.....70%
Hart's St. Tackle Blocks.....50%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50%; Wire Rope Snatch, 50%;
Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Self Loading.....60%
See also Machines, Hoisting.
Boards, Stove—
Zinc, Crystal, &c.....40%
Paper Embossed.....40%
Boards, Wash—
See Washboards.
Bobs, Plumb—
Kenfel & Easer Co.....33%
Boils—
Carriage, Machine, &c.—Common Carriage (cut thread):
 $\frac{1}{2}$ x 6 and smaller.....75%
Larger and Longer.....65%
Phila. Eagle.....\$3.00 list May 24, '99
Bolt Ends, list Feb. 14, '95.....80%
Machine, $\frac{1}{2}$ x 4 and smaller.....65%
Machine, larger and longer.....65%
Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:
Inch.....3 4 5 6 8
Per doz. \$0.30 .55 .45 .60 .80
Cast Iron Spring Foot, Jap'd:
Inch.....0 8 10
Per doz.....\$1.20 1.50 2.25
Cast Iron Chain, Flat, Japanned:
Inch.....0 8 10
Per doz.....\$1.00 1.40 1.65
Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch.....6 8 10
Per doz.....\$0.75 .95 1.25
Wrt Barrel Jap'd.....80%
Wrt "Bronzed".....50%
Wrt Spring.....70%
Wrt Shutter.....50%
Wrt Square Neck.....75%
Wrt Square Neck, & 10%
Ives' Patent Door.....80%
Plow and Stove—
Plow.....65%
Stove.....87%
Tire—
Norway Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '94.....30%
Phila., list Oct. 16, '94.....82%
Bay State, list Dec. 23, '99.....80%

Franklin Moore Co.:
Norway Phila., list Oct. 16, '94.....80%
Eagle Phila., list Oct. 16, '94.....82%
Eclipse, list Dec. 23, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '94.....80%
Eagle Phila., list Oct. 16, '94.....82%
Mount Carmel, list Dec. 23, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 23, '99.....80%
Norway Phila., list Oct. 16, '94.....80%
Upon Nut Co.:
Tire Bolts.....72%
Borers, Tap—
Borers Tap, Ring, with Handle:
Inch.....1 1 $\frac{1}{2}$ 1 $\frac{3}{4}$ 2
Per doz.....\$4.80 5.60 6.40 8.00
Inch.....2 $\frac{1}{4}$ 2 $\frac{1}{2}$ 2 $\frac{3}{4}$
Per doz.....\$6.65 11.50
Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.65; No. 3, \$2.50 each.....25%
Boxes, Mitre—
C. E. Jennings & Co.....30%
Langdon.....15%
Perfection.....40%
Seavey R. & L. Co.:
Nos. 240 to 460.....30%
Nos. 50 and 60.....35%
Braces—
Common Ball, American.....\$1.25@1.30
Barber's.....50%
Fray's Genuine Spool Braces.....60%
Fray's No. 70 to 120, \$1 to 120, 207 to 414.....60%
C. E. Jennings & Co.....50%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat.....50%
Millers Falls Drill Braces.....50%
P. S. & W. Co., Peck's Pat. 60%
Stanley R. & L. Co.:
Stanley.....35%
Victor.....45%
Brackets—
Wrought Steel.....80%
Griffin's Pressed Steel.....80%
Griffin's Folding Brackets.....70%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60%
Bright Wire Goods—
See Wire and Wire Goods.
Broilers—
Kilbourne Mfg. Co.....75%
Western, W. G. Co.....80%
Wire Goods Co.....75%
Buckets, Galvanized—
Price per dozen:
Quart.....49 12 14
Water, Regular.....1.40 1.70 1.90
Water, Heavy.....3.40 3.70 3.90
Fire, Rd. Bottom.....2.80 3.55 3.95
Well.....2.55 2.87 3.15
Bucks, Saw—
Hoosier.....\$0.30
Bull Rings—See Rings, Bull
Butts—Brass—
Wrought, list, Sept., '96. 15@—
Cast Brass, Tiebout's.....50%
Cast Iron—
Fast Joint, Broad.....40%
Fast Joint, Narrow.....40%
Loose Joint.....70%
Loose Pin.....70%
Mayer's Hinges.....70%
Parliament Butts.....70%
Wrought Steel—
Discount.
Reversible and Broad 75%
Light Reversible, Light Narrow.....75%
Loose Joint, Narrow, L'ht Inside Blind, etc.....75%
Back Flaps, Table, Chest.....70%
Cages, Bird—
Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....35%
200, 300, 600 and 900 series.....40%
Hendryx, Bronze:
700, 800 series.....40%
Hendryx, Enamelled.....40%
Calipers—See Compasses.
Calks, Toe and Heel—
Blunt, 1 prong.....per lb. \$1.45
Sharp, 1 prong.....per lb. \$1.45
Burke's Blunt.....40%
Burke's Sharp.....40%

<p>Gautier, Blunt......40¢ Gautier, Blunt.....40¢ Perkins, Blunt.....40¢ Perkins, Blunt.....40¢ Can Openers— See Openers, Can. Cans, Milk— Illinois Pattern.....1.35 1.85 2.05 each. New York Pattern.....1.50 2.20 2.45 each. Baltimore Pattern.....1.50 2.20 2.45 each. Dubuque.....1.35 1.60 1.75 each.</p> <p>Cans, Oil— Buffalo Family Oil Cans: \$18.00 60.00 120.00 gro. net.</p> <p>Caps, Percussion— Eley's E. B.....58¢ G. D.....per M 34¢ F. L.....per M 40¢ G. E.....per M 40¢ Musket.....per M 62¢</p> <p>Primers— Berdan Primers, \$2 per M.....20¢ B. L. Caps (Sturtevant Shell)..... \$2 per M.....20¢ All other primers per M \$1.52 to \$1.60</p> <p>Cartridges— Blank Cartridges: 32 C. F., \$5.50.....1045¢ 38 C. F., \$7.00.....1045¢ 22 cal. Rim, \$1.50.....1045¢ 32 cal. Rim, \$2.75.....1045¢ B. B. Caps, Con. Ball, Regd. \$1.90 B. B. Caps, Round Ball.....\$1.49 Central Fire.....25¢ Target and Sporting Rifle.....15¢ Primed Shells and Bullets.....15¢ Rim Fire, Sporting.....50¢ Rim Fire, Military.....15¢</p> <p>Casters— Bed.....70¢ Plate.....60¢ Philadelphia.....75¢ Acme, Ball Bearing.....33¢ Boss.....70¢ Boss Anti-Friction.....70¢ Gem (Roller Bearing).....60¢ Main & Patent (Roller).....45¢ Standard Ball Bearing.....45¢ Tucker's Patent low list.....30¢ Yale (Double Wheel) low list.....50¢</p> <p>Cattle Leaders— See Leaders, Cattle. Chain, Coil— American Coil, Straight Link: 5-18 3/4 5-16 3/4 7-16 3/4 9-16 3/4 \$3.70 5.90 4.95 4.20 4.05 3.95 3.90 3/4 3/4 1/2 1 1/4 1 1/4 1 1/4 \$3.85 3.70 3.65 3.80 German Coil.....60¢ Halter— Halter Chains.....60¢ German Pattern Halter Chains..... list July 24, '97.....60¢ Covert Mfg. Co.....30¢ Halter.....30¢ Covert's Saddlery Works.....70¢ Halter.....70¢ Cow Ties— See Halters and Ties. Trace, Wagon, &c.— Traces, Western Standard: 100 gr. 6-16—6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100. 6-16—2, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100. 6-16—10-2, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100. NOTE—Add 2c per pair for Hooks. Twist Traces 3c per pair higher than Straight Link. Eastern Standard Traces, Wagon Chain, &c.....60¢ Miscellaneous— Jack Chain, list July 10, '95: Iron.....60¢ Brass.....60¢ Safety Chain.....75¢ G. Pump Chain.....44¢ Covert Mfg. Co.: Breast, Halter, Heel, Rein, Stallion.....40¢ Covert Sad. Works: Breast, Hold Back, Rein.....70¢ Onion Community: Am. Dog Leads and Kennel Chains.....40¢ Niagara Dog Leads and Kennel Chains.....45¢ Wire Goods Co.: Dog Chain.....70¢ Universal Lbl. Jointed Chain.....50¢ Chain and Ribbon, Sash— Onion Community: Copper Chain.....60¢ Steel Chain.....60¢ Pullman: Bronze Chain.....60¢ Steel Chain.....60¢ Sash Chain Attachments, per set. 3¢ Aluminum Sash Ribbon, per 100 ft. Sash Ribbon Attachments, per set. 3¢ Chalk— (From Jobbers). Carpenters' Blue.....gro. 38¢ Carpenters' R. M.....gro. 33¢ Carpenters' White.....gro. 28¢ See also Crayons. Checks, Door— Bardley's.....40¢ Eclipse.....40¢ Pullman, per gro.....40¢ Russwin.....40¢ Chests, Tool— American Tool Chest Co.: Boy's Chests, with Tools.....55¢ Youths' Chests, with Tools.....40¢ Gentlemen's Chests, with Tools.....30¢ Farmers' Chests, with Tools.....20¢ Machinists' Chests, with Tools.....20¢ Tool Cabinets.....50¢ C. E. Jennings & Co.'s Machinists' Tool Chests.....35¢ Chisels— Socket Framing and Flrmer Standard List.....75¢</p>	<p>Buck Bros.....30¢ Charles Buck.....30¢ C. E. Jennings & Co. Socket Firmer No. 10.....60¢ C. E. Jennings & Co. Socket Framing No. 15.....60¢ Ohio Tool Co. s.....70¢ Swan's.....75¢ L. & I. J. White.....30¢ L. & I. J. White, Tanged.....25¢</p> <p>Tanged— Tanged Farmers.....33 1/3¢ Buck Bros.....30¢ Charles Buck.....30¢ C. E. Jennings & Co. Nos. 121, 151.....25¢</p> <p>Cold— Cold Chisels, good quality.....13¢ Cold Chisels, fair quality.....11¢ Cold Chisels, ordinary.....9¢</p> <p>Chucks— Almond Drill Chucks.....35¢ Almond Turret Six-Tool Chucks.....35¢ Beach Pat., each \$9.90.....35¢ Empire.....25¢ Blacksmiths'.....25¢ Jacobs' Drill Chucks.....35¢ Frat's Positive Drive.....25¢ Skinner Patent Chucks.....35¢ Independent Lathe Chucks.....40¢ Universal, Reversible Jaws.....40¢ Combination, Reversible Jaws.....40¢ Drill Chucks, New Model.....25¢ Drill Chucks, Standard.....40¢ Drill Chucks, Skinner Pat.....25¢ Drill Chucks, Positive Drive.....35¢ Planer Chucks.....30¢ Face Plate Jaws.....40¢ Standard Tool Co.: Improved Drill Chuck.....45¢ Union Lathe Co.: Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17.....40¢ Combination, No. 21.....35¢ Scroll Combination, Nos. 82 and 84.....30¢ Geared Scroll, Nos. 33, 34 and 35.....30¢ Independent, Nos. 18 and 318.....40¢ Independent Steel, No. 61.....30¢ Union Cast Drill, Nos. 000, 101, 103.....35¢ Universal 11, 12, 16, 17, 13, 14, 15, 40.....35¢ Universal No. 42.....35¢ Iron Face Plate Jaws, Nos. 28, 30, 43 and 50.....40¢ Steel Face Plate Jaws.....40¢ 72.....35¢ Westcott Patent Chucks: Lathe Chucks.....50¢ Lathe Chuck Auxiliary Drill.....50¢ Little Giant Double Grip Drill.....50¢ Little Giant Drill, Improved.....50¢ Oneida Drill.....50¢ Scroll Combination Lathe.....50¢</p> <p>Clamps— Adjustable, Hammers'.....20¢ Cabinet, Sargent's.....50¢ Carriage Makers, P. S. & W. Co.....40¢ Carriage Makers, Sargent's.....40¢ Bevel, Parallel.....35¢ Linen, P. S. & W. Co. Drop Forge & Tool Co.....40¢ Wood Workers, Hammers'.....40¢ Saw Clamps, see Vises, Saw Filers'.</p> <p>Cleaners, Drain— Iwan's Champion, Adjustable.....55¢ Iwan's Champion, Stationary.....45¢</p> <p>Sidewalk— Star Socket, All Steel.....\$4.05 net Star Shank, All Steel.....\$3.24 net W. & C. Shank, All Steel.....\$4.05 net 7 1/2 in. \$3.00, 8 in. \$3.25</p> <p>Cleavers, Butchers'— Foster Bros.....30¢ New Haven Edge Tool Co.....45¢ Fayette R. Plumb.....30¢ L. & I. J. White.....30¢</p> <p>Clippers, Horse and Sheep— Chicago Flexible Shaft Company: '98 Chicago Horse, each.....\$3.00 1902 Chicago Horse, each.....\$10.75 20th Century Horse, each.....\$5.00 Lightning Belt Horse, each.....\$15.00 Chicago Belt Horse, each.....\$20.00 Stewart's Enclosed Gear Horse.....\$4.75 Stewart's Patent Sheep Shearing Machine, each.....\$12.75</p> <p>Clips, Axle— Regular Styles, list July 1, '05.80</p> <p>Cloth and Netting, Wire— See Wire, &c.</p> <p>Cocks, Brass— Hardware list: Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.....75¢</p> <p>Coffee Mills— See Mills, Coffee.</p> <p>Collars, Dog— Nickel Chain, Walter B. Stevens & Son's list.....40¢ Leather, Walter B. Stevens & Son's list.....40¢</p> <p>Combs, Curry— Metal Stamping Co.....40¢</p> <p>Mane and Tail— Covert's Saddlery Works.....60¢</p> <p>Compasses, Dividers, &c.— Ordinary Goods.....75¢ Bemis & Call Hdw. & Tool Co.: </p>
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No. 24.....25¢	Wire, Brown & Sharpe's.....25¢
No. 22.....10¢	Wire, Morse's.....25¢
Copper.....50¢	Wire, P. S. & W. Co.....35¢
Elbows, Stove Pipe—	Gimlets—Single Cut—
Dover, one piece.....40¢	Numbered assort-
Perfect Elbow (R. M. Co.).....40¢	ments, per gro.
Emery, Turkish	Nail, Metal, No. 1, \$2.00; 2, \$2.40
4 to 16 54 to 220 Flour.	Spike, Metal, No. 1, \$4.00; 2, \$4.30
Kegs.....10.5¢ 54¢ 54¢	Nail, Wood Handled, No. 1,
1/4 Kegs.....10.5¢ 54¢ 54¢	\$2.30; 2, \$2.60
1/2 Kegs.....10.5¢ 54¢ 54¢	Spike, Wood Handled, No. 1,
10-lb. cans.....6 7 6	\$4.30; 2, \$4.60
10 in case.....6 7 6	
10-lb. cans, less	Glass, American Window
than 10.....10¢ 10¢ 8¢	See Trade Report.
Less quantity.....10¢ 10¢ 8¢	Glasses, Level—
NOTE.—Lots 1 to 3 tons a discount	Chapin-Stephens Co.....60¢ 60¢ 10¢ 10¢
of 10% is given.	Glue, Liquid Fish—
Extractors, Lemon Juice	Bottles or Cans, with Brush.....
—See Squeezers, Lemon.	25¢ 10¢ 50¢
Fasteners, Blind—	International Glue Co. (Martin's).....40¢
Zimmerman's.....50¢ 10¢	Grease, Axle—
Wallings.....40¢ 10¢	Common Grade.....gro. \$1.50 @ 6.00
Cord and Weight	Dixon's Everlasting, 10-lb. pails, ea. 85¢
Ives.....40¢	Dixon's Everlasting, in boxes, 2 doz.
Faucets—	1 lb. \$1.20; 2 lb. \$2.00
Cork Lined.....50¢ 50¢ 10¢	Helmet Hard Oil.....25¢
Metallic Key, Leather Lined.....	Griddles, Soapstone—
60¢ 10¢ 70¢	Pike Mfg. Co.....33 1/3¢ 33 1/3¢ 10¢
Red Cedar.....40¢ 10¢ 50¢	Grindstones—
Petroleum.....70¢ 10¢ 75¢	Bicycle Emery Grinder.....\$6.50
B. & L. B. Co.:.....60¢ 10¢	Bicycle Grindstones, each.....\$2.50 @ 3.00
Star.....60¢	Pike Mfg. Co.:.....
West Lock.....50¢ 10¢	Improved Family Grindstones
John Sommer's Peerless Tin Key.....40¢	per inch, 3 doz.....\$2.00
John Sommer's Boss Tin Key.....50¢	Pike Mower and Tool Grinder,
John Sommer's Victor Mtl. Key.....50¢	each.....\$6.00
John Sommer's Duplex Metal Key.....60¢	Grips, Nipple—
John Sommer's Diamond Lock.....40¢	Perfect Nipple Grips.....40¢ 10¢ 22¢
John Sommer's I. X. L. Cork Lined.....50¢	Halters and Ties—
John Sommer's Reliable Cork Lined.....	Cork Ties.....60¢ 10¢ 60¢ 10¢ 5¢
50¢ 10¢	Covert Mfg. Co.:.....
John Sommer's Chicago Cork Lined.....60¢	Web.....45¢
John Sommer's O. K. Cork Lined.....50¢	Jute Rope.....45¢
John Sommer's No Brand, Cedar.....50¢	Sisal Rope.....33 1/3¢
John Sommer's Perfection, Cedar.....50¢	Cotton Rope.....45¢
McKenna, Brass.....25¢	Hemp Rope.....45¢
Burglar Proof, N. P.....25¢	Covert's Saddlery Works.....70¢
Self Measuring.....25¢	Web and Leather Halters.....70¢
Enterprise, 3 doz. \$36.00.....40¢ 10¢	Jute and Manila Rope Halters.....70¢
Lane's, 3 doz. \$36.00.....40¢ 10¢	Sisal Rope Halters.....60¢ 20¢
National Measuring, 3 doz. \$36.00.....40¢ 10¢	Jute, Manila and Cotton Rope
Felloe Plates—	Ties.....70¢
See Plates, Felloe.	Sisal Rope Ties.....60¢ 10¢
Files—Domestic—	Onida Community.....40¢ 40¢ 5¢
List revised Nov. 1, 1899.	Am. Coil and Halters.....45¢ 50¢
Best Brands.....70¢ 10¢ 75¢ 10¢	Am. Cow Ties.....45¢ 50¢
Standard Brands.....75¢ 10¢ 75¢ 10¢	Niagara Coil and Halters.....45¢ 50¢
Lower Grade.....75¢ 10¢ 10¢ 80¢ 10¢	Niagara Cow Ties.....45¢ 50¢ 10¢ 5¢
Imported—	E. T. Rugg & Co.:.....
Stubs' Tapers, Stubs' List, July	Leather Halters.....50¢
24, '97.....33 1/3¢ 10¢	Web Halters and Webbing.....60¢
Fixtures, Fire Door—	Jute and Sisal Rope Halters.....60¢
Richards Mfg. Co.:.....	Jute and Sisal Horse and Cattle
Universal, No. 103.....\$3.75	Ties.....60¢
Special, No. 104.....\$3.75	Cotton Horse Ties.....60¢
Fusible Links, No. 96.....50¢	Livery Ties, Braided.....60¢
Expansion Bolts, No. 107.....60¢ 10¢	Hammers—
Grindstone—	Handled Hammers—
Net Prices:	Heller's Machinists.....40¢ 10¢ 40¢ 10¢ 10¢
Inch.....15 17 19 21	Heller's Farriers.....50¢ 10¢ 40¢ 10¢ 10¢
Per doz.....\$3.25 3.75 4.25 4.75	Magnetic Tack, Nos. 1, 2, 3, \$1.25
P. S. & W. Co.....30¢ 10¢ 40¢	Peck, Stow & Wilcox, Steel.....50¢
Reading Hardware Co.....70¢	Fayette H. Plumb:
Sargent's.....70¢	Plumb, A. E. Nail.....33 1/3¢ 10¢ 7 1/2¢
Stowell's Giant Grindstone Hanger.....	Engineers' and B. S. Hand.....50¢ 7 1/2¢ 35¢ 50¢ 10¢ 7 1/2¢ 5¢
3 doz. \$6.00	Machinists' Hammers.....50¢ 10¢ 40¢ 10¢ 10¢
Stowell's Grindstone Fixtures, Extra	Riveting and Tinner's.....40¢ 2 1/2¢ 40¢ 10¢ 2 1/2¢
Heavy.....50¢ 10¢ 10¢	Sargent's C. S. New List.....40¢
Stowell's Grindstone Fixtures, Light	Heavy Hammers and
.....60¢ 10¢	Sledges—
Fodder Squeezers—	Under 3 lb., per lb., 50¢.....80¢ 10¢
See Compressors.	3 to 5 lb., per lb., 50¢.....80¢ 10¢
Forks—	Over 5 lb., per lb., 50¢.....80¢ 10¢
NOTE.—Manufacturers are	Wilkinson's Smith's.....1 lb. 9¢ 10¢ 10¢
selling from the list of September	Handles—
1, 1894, but many jobbers are still	Agricultural Tool Handles
using list of August 1, 1899, or	Aze, Pick, &c.....60¢ 10¢ 60¢ 10¢ 5¢
selling at net prices.	Hoe, Rake, &c.....45¢ 50¢
Iowa Dig-Ezy Potato.....60¢ 10¢	Fork, Shovel, Spade, &c.:.....45¢ 50¢
Victor, Hay.....60¢ 15¢ 2 1/2¢	Long Handles.....50¢ 50¢ 5¢
Victor, Manure.....60¢	D Handles.....50¢ 50¢ 5¢
Victor, Header.....60¢	Atkins.....40¢
Champion, Hay.....60¢	Champion.....45¢ 15¢ 10¢
Champion, Manure.....60¢ 15¢ 2 1/2¢	Diston's.....50¢
Columbia, Hay.....60¢ 20¢	Mechanics' Tool Handles—
Columbia, Manure.....70¢	Auger, assorted.....gro. \$2.50 @ \$3.00
Columbia, Spading.....70¢ 12¢	Brad Avel.....gro. \$1.65 @ \$1.75
Hawkeye Wood Barley.....60¢ 10¢	Chisel Handles:
W. & C. Potato Digger.....60¢ 20¢	Apple Tanged Firmer, gro.
Acme Hay.....60¢ 20¢	assorted.....\$2.50 @ \$2.65
Acme Manure, 4 time.....60¢ 10¢ 5¢	Hickory Tanged Firmer, gro.
Dakota Header.....60¢ 20¢	assorted.....\$2.15 @ \$2.40
Jackson Steel Barley.....60¢ 20¢	Apple Socket Firmer, gro.
Kansas Header.....60¢	assorted.....\$1.75 @ \$1.95
W. & C. Favorite Wood Barley.....40¢	Hickory Socket Firmer, gro.
Plated.—See Spoons.	assorted.....\$1.45 @ \$1.60
Frames—Saw—	Hickory Socket Framing, gro.
White, S'gt Bar, per doz. 75¢ @ 80¢	assorted.....\$1.60 @ \$1.75
Red, S'gt Bar, per doz. \$1.00 @ 1.25	File, assorted.....gro. \$1.30 @ \$1.50
Red, Dbl. Brace, per doz. \$1.40 @ 1.50	Hammer, Hatchet, &c.....60¢ 10¢ 60¢ 10¢ 5¢
Freezers, Ice Cream—	Hand Saw, Varished, doz.
Qt.....1 2 3 4 6	80¢ 85¢; Not Varished.....65¢ 70¢
Each.....\$1.30 \$1.60 \$1.90 \$2.20 \$2.80	Plane Handles:
Fruit and Jelly Presses—	Jack, doz. 30¢; Jack, Bolted 75¢
See Presses, Fruit and Jelly.	Fore, doz. 45¢; Fore, Bolted 90¢
Fry Pans—See Pans, Fry.	Chapin-Stephens Co.:.....40¢ 40¢ 10¢
Fuse—Per 1000 Feet.	Chisel.....65¢ 65¢ 10¢
Hemp.....\$2.75	File and Awl.....65¢ 65¢ 10¢
Cotton.....3.20	Saw and Plane.....40¢ 40¢ 10¢
Waterproof Spl. Taped.....3.65	Screw Driver.....40¢ 40¢ 10¢
Waterproof Dbl. Taped.....4.10	Millers Falls Adj. and Ratchet Anger
Waterproof Tpl. Taped.....5.15	Handles.....15¢ 10¢
Gates, Molasses and Oil—	Nicholson Simplicity File Handle.....gro. \$1.85 @ \$1.50
Stebbins' Pattern.....80¢ 10¢	Hangers—
Gauges—	NOTE.—Barn Door Hangers are
Marking, Mortise, &c. 50¢ 10¢ 60¢	generally quoted per pair, without track,
Chapin-Stephens Co.:.....	and Parlor Door Hangers per double set
Marking, Mortise, &c. 50¢ 10¢ 60¢ 10¢ 10¢	with track, &c.
Scholl's Patent.....50¢ 10¢ 50¢ 10¢ 10¢	
Door Hangers.....50¢ 50¢ 10¢	
Stanley R. & L. Co.'s Butt and	
Rabbit Gauge.....50¢	
Marking and Mortise.....60¢	

Wire, Brown & Sharpe's.....25¢	Alth Mfg. Co.:.....
Wire, Morse's.....25¢	Reliable, No. 1.....per doz. \$9.00
Wire, P. S. & W. Co.....35¢	Reliable, No. 2.....per doz. \$9.00
Gimlets—Single Cut—	Chicago Spring Butt Co.:.....
Numbered assort-	Friction.....25¢
ments, per gro.	Oscillating.....25¢
Nail, Metal, No. 1, \$2.00; 2, \$2.40	Big Twin.....25¢
Spike, Metal, No. 1, \$4.00; 2, \$4.30	Chisholm & Moore Mfg. Co.:.....
Nail, Wood Handled, No. 1,	Baggage Car Door.....50¢
\$2.30; 2, \$2.60	Elevator.....30¢
Spike, Wood Handled, No. 1,	Railroad.....50¢
\$4.30; 2, \$4.60	Crouk & Carrier Mfg. Co.:.....
	Loose Axle.....60¢ 10¢
Glass, American Window	Roller Bearing.....70¢
See Trade Report.	Griffin Mfg. Co.:.....
Glasses, Level—	Solid Axle, No. 10, \$12.00.....70¢
Chapin-Stephens Co.....60¢ 60¢ 10¢ 10¢	Roller Bearing, No. 11, \$15.00.....70¢
Glue, Liquid Fish—	Roller Bearing, Ex. Hy., No.
Bottles or Cans, with Brush.....	25, \$18.00.....100¢
25¢ 10¢ 50¢	Hinge Axles, \$16.00.....60¢ 10¢
International Glue Co. (Martin's).....40¢	Lane Bros. Co.:.....
Grease, Axle—	Parlor, Ball Bearing.....\$4.00
Common Grade.....gro. \$1.50 @ 6.00	Parlor, Standard.....\$3.15
Dixon's Everlasting, 10-lb. pails, ea. 85¢	Parlor, No. 105.....2.85
Dixon's Everlasting, in boxes, 2 doz.	Parlor, New Model.....\$2.80
1 lb. \$1.20; 2 lb. \$2.00	Parlor, New Champion.....\$2.25
Helmet Hard Oil.....25¢	Barn Door, Standard.....60¢ 5¢
Griddles, Soapstone—	Hinged.....net \$6.10
Pike Mfg. Co.....33 1/3¢ 33 1/3¢ 10¢	Covered.....60¢ 2¢
Grindstones—	Special.....70¢ 5¢
Bicycle Emery Grinder.....\$6.50	Lawrence Bros.:.....
Bicycle Grindstones, each.....\$2.50 @ 3.00	Advance.....60¢ 10¢
Pike Mfg. Co.:.....	Cleveland.....75¢
Improved Family Grindstones	Clipper, No. 75.....60¢
per inch, 3 doz.....\$2.00	Crown.....60¢ 10¢
Pike Mower and Tool Grinder,	Easy Parlor Door, Dbl. Sets,
each.....\$6.00	\$2.50; Single Sets, \$1.25.....60¢ 5¢
Grips, Nipple—	Hummer.....70¢ 5¢
Perfect Nipple Grips.....40¢ 10¢ 22¢	New York.....60¢ 10¢
Halters and Ties—	Peerless.....75¢
Cork Ties.....60¢ 10¢ 60¢ 10¢ 5¢	Sterling.....60¢ 10¢
Covert Mfg. Co.:.....	McKinney Mfg. Co.:.....
Web.....45¢	Clant.....60¢ 10¢
Jute Rope.....45¢	No. 2 Standard, \$18.....60¢ 10¢
Sisal Rope.....33 1/3¢	Hinged Hangers, \$16.....50¢
Cotton Rope.....45¢	Meyers' Stayon Hangers.....60¢ 5¢
Hemp Rope.....45¢	Richards Mfg. Co.:.....
Covert's Saddlery Works.....70¢	Hangers, Nos. 47, 48, 117, 247,
Web and Leather Halters.....70¢	80¢ 5¢
Jute and Manila Rope Halters.....70¢	Pioneer Wood Track No. 3, \$2.00
Sisal Rope Halters.....60¢ 20¢	Ball B'g St'l Track No. 10, 50¢ 10¢
Jute, Manila and Cotton Rope	Roller B'g St'l Track No. 12, \$2.15
Ties.....70¢	Roller B'g St'l Track No. 13, \$2.30
Sisal Rope Ties.....60¢ 10¢	Roller B'g, Nos. 39, 41, 43,
Onida Community.....40¢ 40¢ 5¢	70¢ 10¢
Am. Coil and Halters.....45¢ 50¢	Hero, Adj. Track No. 19, 50¢ 10¢
Am. Cow Ties.....45¢ 50¢	Adjustable Track Tandem Trol-
Niagara Coil and Halters.....45¢ 50¢	ley Track No. 16.....50¢ 10¢
Niagara Cow Ties.....45¢ 50¢ 10¢ 5¢	Seal, Steel Track No. 8.....\$2.25
E. T. Rugg & Co.:.....	Auto Adj. Track No. 22, 50¢ 10¢
Leather Halters.....50¢	Trolley B. D. No. 17.....\$1.25
Web Halters and Webbing.....60¢	Trolley F. D. No. 120.....\$2.10
Jute and Sisal Rope Halters.....60¢	Trolley F. D. No. 121.....\$2.25
Jute and Sisal Horse and Cattle	Trolley F. D. No. 150.....\$2.35
Ties.....60¢	Safety Underwriters, F. D. No.
Cotton Horse Ties.....60¢	101.....50¢
Livery Ties, Braided.....60¢	Tandem No. 41, 2 1/2 and 3 60¢ 10¢
Hammers—	Palace, Adjustable Track No.
Handled Hammers—	132.....50¢ 10¢
Heller's Machinists.....40¢ 10¢ 40¢ 10¢ 10¢	Royal, Adjustable Track No.
Heller's Farriers.....50¢ 10¢ 40¢ 10¢ 10¢	122.....50¢ 10¢
Magnetic Tack, Nos. 1, 2, 3, \$1.25	Ives Wood Track No. 1.....\$2.00
Peck, Stow & Wilcox, Steel.....50¢	Trolley B. D. No. 20.....50¢ 10¢
Fayette H. Plumb:	Trolley B. D. No. 24.....\$1.30
Plumb, A. E. Nail.....33 1/3¢ 10¢ 7 1/2¢	Trolley B. D. No. 27.....\$1.40
Engineers' and B. S. Hand.....50¢ 7 1/2¢ 35¢ 50¢ 10¢ 7 1/2¢ 5¢	Trolley B. D. No. 28.....\$1.60
Machinists' Hammers.....50¢ 10¢ 40¢ 10¢ 10¢	Roller Bearings, Nos. 37, 38, 39,
Riveting and Tinner's.....40¢ 2 1/2¢ 40¢ 10¢ 2 1/2¢	41, 43, 44, Sizes 1 and 2, 70¢ 10¢
Sargent's C. S. New List.....40¢	Adjustable, No. 42.....60¢ 10¢
Heavy Hammers and	Anti-friction, No. 41, Size 2 1/2,
Sledges—	and 3.....60¢ 10¢
Under 3 lb., per lb., 50¢.....80¢ 10¢	Hinged Tandem No. 48.....60¢ 5¢
3 to 5 lb., per lb., 50¢.....80¢ 10¢	Folding Door B. B. Swivel No.
Over 5 lb., per lb., 50¢.....80¢ 10¢	135.....40¢
Wilkinson's Smith's.....1 lb. 9¢ 10¢ 10¢	Safety Door Hanger Co.:.....
Handles—	U. S. Standard King Sledge.....60¢
Agricultural Tool Handles	U. S. Standard Hinge.....60¢
Aze, Pick, &c.....60¢ 10¢ 60¢ 10¢ 5¢	Stowell Mfg. & Foundry Co.:.....
Hoe, Rake, &c.....45¢ 50¢	Acme Parlor Ball Bearing.....40¢
Fork, Shovel, Spade, &c.:.....45¢ 50¢	Ajax Hinge Door.....60¢
Long Handles.....50¢ 50¢ 5¢	Apex Parlor Door.....50¢ 10¢ 5¢
D Handles.....50¢ 50¢ 5¢	Atlas.....60¢
Atkins.....40¢	Baggage Car Door.....60¢
Champion.....45¢ 15¢ 10¢	Climax Anti-Friction.....50¢ 10¢
Diston's.....50¢	Elevator.....40¢
Mechanics' Tool Handles—	Express.....50¢
Auger, assorted.....gro. \$2.50 @ \$3.00	Freight Car Door.....60¢
Brad Avel.....gro. \$1.65 @ \$1.75	Interstate.....60¢ 10¢
Chisel Handles:	Lundy Parlor Door.....50¢ 10¢
Apple Tanged Firmer, gro.	Magic.....60¢
assorted.....\$2.50 @ \$2.65	Matchless.....60¢ 10¢
Hickory Tanged Firmer, gro.	Nansen.....70¢ 5¢
assorted.....\$2.15 @ \$2.40	Parlor Door.....50¢ 10¢
Apple Socket Firmer, gro.	Railroad.....50¢ 10¢
assorted.....\$1.75 @ \$1.95	Refrigerator Door.....50¢
Hickory Socket Firmer, gro.	Street Car Door.....50¢
assorted.....\$1.45 @ \$1.60	Steel, Nos. 300, 401, 500.....50¢ 10¢
File, assorted.....gro. \$1.30 @ \$1.50	Underwriters' Fire Door.....40¢
Hammer, Hatchet, &c.....60¢ 10¢ 60¢ 10¢ 5¢	Wild West Warehouse Door.....50¢
Hand Saw, Varished, doz.	Zenith for Wood Track.....50¢ 10¢
80¢ 85¢; Not Varished.....65¢ 70¢	A. L. Street Iron Works:
Plane Handles:	Check Back.....70¢
Jack, doz. 30¢; Jack, Bolted 75¢	Climax Anti-Friction.....50¢ 10¢
Fore, doz. 45¢; Fore, Bolted 90¢	Eagle.....70¢
Chapin-Stephens Co.:.....40¢ 40¢ 10¢	Hylo Hinge.....60¢
Chisel.....65¢ 65¢ 10¢	New Perfection.....60¢
File and Awl.....65¢ 65¢ 10¢	Pilot Hinge.....60¢
Saw and Plane.....40¢ 40¢ 10¢	Rider Wooster.....65¢
Screw Driver.....40¢ 40¢ 10¢	Western Pattern.....70¢
Millers Falls Adj. and Ratchet Anger	Taylor & Boggs F'y Co.'s Kid-
Handles.....15¢ 10¢	der's Roller Bearing, 50¢ 15¢ 10¢ 5¢
Nicholson Simplicity File Handle.....gro. \$1.85 @ \$1.50	Hangers—Garment—
Hangers—	Pullman Trouser, gro. 1 pair Flat
NOTE.—Barn Door Hangers are	Aluminum, \$9.00; 1 pair Round Nick-
generally quoted per pair, without track,	eled, \$9.00; 4 pair Round Nick-
and Parlor Door Hangers per double set	\$2.00; 1 pair Flat Gun Metal, \$12.00;
with track, &c.	1 pair Flat Black Enamelled, \$7.50;

Albith Mfg. Co.:.....	Reliable, No. 1.....	per doz. \$9.00
Chicago Spring Butt Co.:.....	Reliable, No. 2.....	per doz. \$9.00
Friction.....		25%
Oscillating.....		25%
Big Twin.....		25%
Chisholm & Moore Mfg. Co.:.....		
Baggage Car Door.....		50%
Elevator.....		30%
Railroad.....		50%
Crouk & Carrier Mfg. Co.:.....		
Loose Axle.....		60&10%
Roller Bearing.....		70%
Griffin Mfg. Co.:.....		
Solid Axle, No. 10, \$12.00.....		70%
Roller Bearing, No. 11, \$15.00.....		70%
Roller Bearing, Ex. Hy., No.		
25, \$18.00.....		70%
Hinged Hangers, \$16.00.....		60&10%
Lane Bros. Co.:.....		
Parlor, Ball Bearing.....		\$4.00
Parlor, Standard.....		\$3.15
Parlor, No. 105.....		\$2.85
Parlor, New Model.....		\$2.80
Parlor, New Champion.....		\$2.25
Barn Door, Standard.....		60&10%
Hinged.....		net \$6.10
Covered.....		60&2%
Special.....		70&5%
Lawrence Bros.:.....		
Advance.....		60&10%
Cleveland.....		75%
Clipper, No. 75.....		60%
Crown.....		60&10%
Easy Parlor Door, Dbl. Sets,		
\$2.50; Single Sets, \$1.25.....		60&5%
Giant.....		60&5%
Hummer.....		70&5%
New York.....		60&10%
Peerless.....		75%
Sterling.....		60&10%
McKinney Mfg. Co.:.....		
No. 1, Special, \$15.....		60&10%
No. 2, Standard, \$15.....		60&10%
Hinged Hangers, \$16.00.....		60&10%
Meyers, Stayon Hangers.....		60&5%
Richards Mfg. Co.:.....		
Hangers, Nos. 47, 48, 117, 247,		
		60&5%
Pioneer Wood Track No. 3, \$2.00		
Ball B'r'g S't'l Track No. 10, \$6.00		
Roller B'r'g S't'l Track No. 12, \$2.15		
Roller B'r'g S't'l Track No. 13, \$2.30		
Roller B'r'g, Nos. 39, 41, 43,		
		70&10%
Hero, Adj. Track No. 19, \$5.00		
Adjustable Track Tandem Trol-		
ley Track No. 16.....		50&10%
Seal, Steel Track No. 8.....		\$2.25
Hero, Adj. Track No. 14, Track No. 12, \$1.15		
Trolley B. D. No. 17.....		\$1.25
Trolley F. D. No. 123.....		\$2.10
Trolley F. D. No. 121.....		\$2.25
Trolley F. D. No. 150.....		\$2.35
Safety Underwriters F. D. No.		
101.....		50%
Tandem No. 14, Track No. 12, \$1.15		
Palace, Adjustable.....		30&10%
132.....		50&10%
Royal, Adjustable Track No.		
122.....		50&10%
Ives' Wood Track No. 1.....		\$2.00
Trolley B. D. No. 20.....		50&10%
Trolley B. D. No. 21.....		\$1.30
Trolley B. D. No. 22.....		\$1.30
Trolley B. D. No. 23.....		\$1.60
Roller Bearings, Nos. 37, 38, 39,		
41, 43; 44, Sizes 1 and 2, 70&10%		
Anti-friction, No. 42.....		60&10%
Anti-friction, No. 44, Sizes 2 1/4		
and 3.....		60&10%
Hinged Tandem No. 48.....		60&5%
Folding Door B. B. Swivel No.		
135.....		40%
Safety Door Hanger Co.:.....		
Storm King Safety.....		60%
U. S. Standard Hinge.....		60%
Stowell Mfg. & Foundry Co.:.....		
Axle Hinge Ball Bearing.....		40%
Ajax Hinge Ball Bearing.....		40%
Apex Parlor Door.....		50&10&5%
Atlas.....		60%
Baggage Car Door.....		50%
Climax Anti-Friction.....		50&10%
Elevator.....		40%
Nansen.....		50&5%
Freight Car Door.....		50%
Interstate.....		60&10%
Lundy Parlor Door.....		50&10%
Magie.....		60%
Matchless.....		60&10%
Nansen.....		50&5%
Parlor Door.....		70&5%
Railroad.....		50&10%
Rex Hinge Door.....		60%
Street Car Door.....		50%
Steel, Nos. 300, 401, 500.....		50&10%
Underwriters' Fire Door.....		40%
Wild West Warehouse Door.....		40%
Zenith for Wood Track.....		50&10%
A. L. Sweet Iron Works:		
Check Back.....		70%
Climax Anti-Friction.....		50&10%
Eagle.....		70%
H. H. Hinge.....		60%
New Perfection.....		60%
Pilot.....		60%
Pilot Hinge.....		60%
Rider Woonster.....		65%
Union Patent.....		70%
Taylor & Boggs.....		70%
der's Roller Bearing.....		50&15&10&5%
Hangers—Garment—		
Pullman Trouser, # gro. 1, 1 pair Flat		
Aluminy, \$9.00; 1 pair Round Nick-		
eled, \$9.00; 4 pair Round Nickeled,		
\$7.00; 1 pair Flat Gun Metal, \$12.00;		
1 pair Flat Black Enameled, \$7.50;		
1 pair Wood Clamp, \$13.00; Skirt		
Hangers, Folding, per gro., \$21.00;		
Coat Hangers, Folding, per gro.,		
\$8.00; Garment Hanger Rods, Round		
Nickeled, per gro., \$15.00; Garment		
Hanger Loops, Round Nickeled,		
per doz.....		\$15.00
Victor Folding.....		\$2.00
Western, W. G. Co.....		70&10%
Gate—		
Myers' Patent Gate Hangers, # doz.		
net.....		\$4.50
Joist and Timber—		
Lane Bros. Co.....		30%
Hasps—		
Griffin's Security Hasp.....		50%
McKinney's Perfect Hasp, # doz.....		50%
Hatchets—		
Regular list, first quality.....		50%
Second quality \$1.00 per doz. less		
than first quality.		

Screw Hook { 6 to 12 in. .lb. 3 3/4¢
and Strap. { 14 to 20 in. .lb. 3 3/4¢
{ 22 to 36 in. .lb. 3 3/4¢

Screw Hook and Eye: { 1/2 to 1 inch .lb. 6 1/4¢
{ 1 1/2 inch .lb. 7 1/4¢
{ 2 inch .lb. 8 1/4¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers. 30¢ & 2¢
Hods— Coal—

Inch 15 16 17 18
Galv. Open. \$2.50 2.75 3.00 3.25
Jap. Open. \$1.90 2.10 2.25 2.55
Galv. Funnel. \$3.00 3.30 3.60 3.90
Jap. Funnel. \$2.45 2.65 2.85 3.50

Masons' Etc.—
Cleveland Wye Spring Co.:
Steel Brick, No. 162. each \$0.95
Steel Mortar, No. 158. each \$1.25

Hoes— Eye—
Scovill and Oval Pattern. 60¢ to 10¢ to 10¢ to 10¢
Grub, list Feb. 23, 1899. 70¢ to 10¢ to 10¢ to 10¢

D. & H. Scovill. 33 1/2%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding No. 1, \$2.00; No. 2, \$2.25
Ft. Madison Cotton Hoe. 70¢ to 10¢
Ft. Madison Crescent Cultivator Hoe. 70¢ to 10¢
Ft. Madison Mattock Hoe. 70¢ to 10¢
Regular Weight. 60¢ to 70¢
Junior Size. 40¢ to 60¢
Ft. Madison Sprouting Hoe. 50¢
Ft. Madison Dixie Tobacco Hoe. 70¢ to 10¢

Kretzinger's Cut Easy. 75¢ to 10¢
Warren Hoe. 45¢ to 10¢
W. & C. Ivanhoe. 75¢ to 10¢
B. B. 6 in. Cultivator Hoe. \$3.15
B. B. 6 1/2 in. \$3.35
Acme Wedding. 40¢ to 60¢
W. & C. L. tining Shovel Hoe. \$4.85

Hoisting Apparatus—
See Machines, Hoisting.

Holders— Bit—

Angular, 1/2 doz. \$24.00. 45¢ to 10¢
Bardsley's 45¢
Empire 50¢
Pullman 50¢
Superior 33 1/2%

File and Tool—

Nicholson File Holders and File

Handles 33 1/2% to 40%

Fruit Jar—

Triumph Fruit Jar Holder, 1/2 gross, \$10.80; 1/2 doz. \$1.25

Hones—Razor—

Pike Mfg. Co., Belgian, German and Swat. 50%

Hooks—Cast Iron—

Bird Cage, Reading. 40%
Bird Cage, Sargent's List. 60¢ to 10¢
Ceiling, Sargent's List, Nos. 29, 32, 33, 125, 132, 133 and 135. 50¢ to 10¢
Clothes Line, Reading List. 40%
Clothes Line, Sargent's List. 50¢ to 10¢
Coat and Hat, Sargent's List. 50¢ to 10¢
Coat and Hat, Reading. 45¢ to 20¢
Coat and Hat, Stowell's. 70%
Coat and Hat, Wrightville. 40%
Harness, Reading List. 60%
School House, Stowell's. 70%

Wire—

Belt 80¢ to 10¢ %

Wire C. & H. Hooks. 75¢ to 10¢ to 10¢ to 10%

Columbian Hdw Co., Gem. 70¢ to 10%

Parker Wire Goods Co., King. 70¢ to 10%

Van Wagoner, Coat and Hat. 70%

Western W. G. Co. Molding. 75%

Wire Goods Co.: 60¢ to 10%

Acme 70%

Chief 70%

Crown 75%

Czar 65%

V Brace 75%

Czar Harness. 50¢ to 10%

Wrought Iron—

Box, 6 in., per doz., \$1.00; 8 in., \$1.25; 10 in., \$2.50.

Cotton doz. \$1.05 to \$1.25

Wrought Staples, Hooks & See Wrought Goods

Hooks, Bench, see Stops, Bench.

Bush, Light, doz. \$1.75; Medium, \$5.35; Heavy, \$6.25

Grass, best, all sizes, per doz. \$1.60

Grass, common grades, all sizes, per doz. \$1.30

Whiffletree lb. 5¢ to 6¢

Hooks and Eyes: 60¢ to 10¢ to 10¢ to 10%

Covert Mfg. Co. Gate and Scuttle

Hooks 40%

Covert Saddlery Works' Self Locking

Gate and Door Hook. 60%

Ft. Madison Cut-Easy Corn Hooks. 40¢ to 10¢

Bench Hooks—See Bench Stops.

Corn Hooks—See Knives, Corn.

Horse Nails—

See Nails, Horse.

Horseshoes—

See Shoes, Horse.

Hose, Rubber—

Garden Hose, 1/2-inch:

Competition ft. 5 @ 6¢

3-ply Guaranteed. ft. 8 @ 9¢

4-ply Guaranteed. ft. 10 @ 11¢

Cotton Garden, 1/2-in., coupled:

Low Grade. ft. 8 @ 9¢

Fair Quality. ft. 10 @ 11¢

Irons— Sad—

From 1/4 to 10 lb. 3 @ 3 1/4¢

R. B. Sad Irons. lb. 3 1/4 @ 3 1/4¢

Mrs. Potts', cents per set:
Nos. 50 55 60 65
Jap'd Tops. 68 65 78 71
Tin'd Tops. 71 68 81 78
New England Pressing. lb. 5 1/4 @ 1 1/4¢

Pinking—

Pinking Irons. doz. 60¢

Irons, Soldering

See Capers.

Jacks, Wagon—

Covert Mfg. Co.: 30¢ & 2¢

Auto Screw. 45%

Steel 45%

Covert's Saddlery Works: 60¢ to 10%

Victor 60%

Lockport 50%

Lane's Steel. 30¢ to 10¢

Richards' Tiger Steel No. 130. 50¢ to 10%

Smith & Hemenway Co.'s. 25%

Kettles—

Brass, Spun, Plain. 20¢ to 25%

Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Poster Bros. Butcher, &c. 30%

Wilkinson Shear & Cutlery Co. 60%

Corn—

Wilkinson Wilcut Brand Knives and

Hooks 60%

Withington Acme. 40¢ to 60¢

Dent. \$2.75; Adj. Serrated. \$2.25

Serrated. \$2.10; Yankee No. 1, \$1.50;

Yankee No. 1. \$1.15

Drawing—

Standard List. 75¢ to 10¢ to 10¢ to 10%

C. E. Jennings & Co., Nos. 45, 46, 60.

Jennings & Griffin, Nos. 41, 42. 60%

Ohio Tool Co.'s. 70%

Swan's 75%

Watrous 16%

L. & L. White. 20¢ to 10%

Hay and Straw—

Serrated Edge per doz. \$5.75 to \$6.00

Iwan's Sickle Edge. 40¢ to 60¢

Iwan's Serrated. 40¢ to 60¢

Mincing—

Buffalo 1/2 doz. \$13.00

Miscellaneous—

Farriers' doz. \$3.00 to \$3.25

Westenholm's doz. \$3.00 to \$3.25

Knobs—

Base, 2 1/2-inch, Birch, or Maple,

Rubber Tip. gro. \$1.25 to \$1.50

Carriage, Jap., all sizes. 40¢ to 45¢

Door, Mineral. doz. 65¢ to 70¢

Door, Por. Jap'd. doz. 70¢ to 75¢

Door, Por. Nickel. doz. \$2.05 to \$2.15

Bardsley's Wood Door, Shutters, &c. 15%

Picture, Sargent's. 60¢ to 10¢ to 10%

Lacing, Leather—

See Belting, Leather.

Ladders, Store, &c.—

Lane's Store. 25%

Myers' Noiseless Store Ladders. 50%

Richards Mfg. Co.: 50%

Improved Noiseless, No. 112. 50%

Climax Shelf, No. 113. 50%

Trolley, No. 109. 50%

Ladles, Melting—

L. & G. Mfg. Co. (low list). 25%

R. S. & W. 50%

Reading 40%

Sargent's 50¢ to 10%

Lanterns, Tubular—

Regular Tubular, No. 0. doz. \$4.25 to \$4.50

Lift Tubular, No. 0. doz. \$4.75 to \$5.00

Hinge Tubular, No. 0. doz. \$4.75 to \$5.00

Other Styles. doz. \$4.75 to \$5.00

Bull's Eye Police—

No. 1, 2 1/2-inch. \$2.75 to \$3.00

No. 2, 3-inch. \$3.00 to \$3.25

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron. 50%

Stowell's Badger, Cast Iron. 50%

Latches— Thumb—

Roggin's Latches, with screw. doz. 35¢ to 40¢

Door—

Cronk & Carrier Mfg. Co., No. 101. 1/2 doz. \$2.30

Cronk & Carrier Mfg. Co., Latch, 50%

Hasp and Staples. 50%

Richards' Bull Dog, Heavy, No. 125. 50¢ to 65¢

Richards' Trump, No. 127. \$1.50

Leaders, Cattle—

Small. doz. 80¢; large, 60¢

Covert Mfg. Co.: 45%

Cotton, Hemp and Jute, 45%;

Sisal, 33 1/2%.

Lifters, Transom—

R. & E. 33 1/2%

Lines—

Wire Clothes, Nos. 18 19 20

100 feet. \$2.25 2.60 1.75

75 feet. \$1.75 1.35 1.10

100 feet. \$2.50; Gilt Edge. \$25.00; Air

Line, \$23.00; Acme, \$19.00; Alabama,

\$17.00; Empire, \$16.00; Advance,

\$14.00; Eclipse, \$13.50; Chicago,

\$11.50; Standard, \$10.50; Columbia,

\$9.50; Allston, \$13.50; Calhoun, \$12.00.

Samson Cordage Works:

Solid Braided Chalk, Nos. 0 to 3. 40%

Silver Lake Braided Chalk, No. 0,

\$6.00; No. 1, \$5.50; No. 2, \$7.00; No.

3, \$7.50.

Masons' Lines, Shade Cord, &c.: 20%

White Cotton, No. 3 1/4, \$1.50; No. 4,

\$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/4,

\$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;

Linon, No. 3 1/4, \$2.50; No. 4, \$3.50;

No. 4 1/2, \$4.50.

Tent and Awning Lines: No. 5,

White Cotton, \$7.50; Drab Cotton,

\$8.50.

Clothes Lines, White Cotton: 50 ft.,

\$2.75; 60 ft., \$3.25; 70 ft., \$3.75;

ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;

100 ft., \$5.25.

Locks— Cabinet—

Cabinet Locks. 33 1/2% to 33 1/2% to 75 1/2%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.

Reading Hardware Co. 40%

R. & E. Mfg. Co. 40%

Sargent & Co. 10¢ to 10%

Stowell's Steel Door Latches. 30%

Stowell's 40%

Elevator—

Padlocks—

Wrought Iron. 75¢ to 10¢ to 80¢ to 6%

Net prices are general.

R. & E. Mfg. Co. Wrought Steel and

Brass 75¢ to 10%

Sash, &c.—

Ives' Patent. 62 1/2%

Bronze and Brass. 50¢ to 10%

Crescent. 62 1/2%

Window Ventilating. 60%

Robison Patent Ventilating Sash. 55%

Wrought Bronze and Brass. 55%

Wrought Steel. 55%

Pullman Patent Ventilating Lock. 25%

Reading 78.....	30 doz.	\$6.25
Rock, y Table.....	30 doz.	\$6.20
Turn Table 98.....	30 doz.	\$6.00
White Mountain.....	30 doz.	\$5.00

Potato—

Saratoga.....	30 doz.	\$7.00
White Mountain.....	30 doz.	\$6.00

Picks and Mattocks—

List Feb. 23, 1899.....	75%
Cronk's Handled Garden Mattock.....	33 1/2%

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass.....	60@60@10%
Iron, list Nov. 11, '85.....	60@60@10%

Pipe, Cast Iron Soil—

Carload lots.

Standard, 2-6 in. 50@10@50@10@5%	
Extra Heavy, 2-6 in.....	65@10%
Fittings.....	70@10@70@10@5%

Pipe, Merchant—

Consumers, Carloads.

	Blk. Galv.	Blk. Galv.
1/4 & 1/2 in. 71%	55%	52%
3/4 in. 73%	59%	56%
1 in. 75%	63%	60%
1 1/4 to 6 in. 79%	69%	66 1/2%
7 to 12 in. 74%	59%	71 1/2%

Pipe, Vitrified Sewer—

Carload lots.

Standard Pipe and Fittings, 2 to 24 in.:	
New England.....	68%
New York and New Jersey.....	71%
Maryland, Delaware, E. Pa. 75%	
West. Pa. and West Va. 77%	
Virginia.....	76%
Ohio, Michigan and Ky. 77%	
Indiana.....	77%

NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:	
5 in., per 100 joints.....	\$8.00
6 in., per 100 joints.....	\$8.50
7 in., per 100 joints.....	\$9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual.....	40@10%
Bench, second qual.....	50@10%
Molding.....	33 1/2@10%
Bailey's (Stanley R. & L. Co.).....	40%
Chapin-Stephens Co.:	
Bench, First Quality.....	40@40@10%
Bench, Second Quality.....	50@50@10%
Molding.....	33 1/2@33 1/2@10%
Toy and German.....	10@40@10%
Chapin's.....	60%
Ohio Tool Co.:	
Bench, First Quality.....	40@40@10%
Bench, Second Quality.....	50@50@10%
Molding.....	33 1/2@33 1/2@10%
Adjustable Wood Bottom.....	60%
Union.....	60%

Iron Planes—

Bailey's (Stanley R. & L. Co.).....	40%
Chapin's Iron Planes.....	50@10%
Miscellaneous Planes (Stanley R. & L. Co.).....	35%
Ohio Tool Co.'s Iron Planes.....	60%
Sargent's.....	60@10%
Union.....	60%

Plane Irons—

Wood Bench Plane Irons.....	55@10@30%
Buck Bros.....	30%
Chapin-Stephens Co.....	30@30@10%
Ohio Tool Co.....	30%
Stanley R. & L. Co.....	35%
Union.....	50%
L. & I. J. White.....	20@5@25%

Planners, Corn, Hand—

Kohler's Eclipse.....	30 doz.	\$8.50
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Plates—

Self-Sealing Pie Plates (R. M. Co.), 30 doz.	\$2.00	50%
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Pliers and Nippers -

Pliers and Nippers—

Button Pliers.....	75@10@75, 10, 5%
Gas Burner, per doz., 5 in., \$1.25	
@ \$1.30; 6 in., \$1.45 @ \$1.50.	
Gas Pipe.....	7 1/2 10 12-4n.

Acme Nippers.....	\$2.00 \$2.25 \$3.00 \$3.75
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Cronk & Carrier Mfg. Co.:	
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American Button.....	75@10%
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Cronk's.....	60%
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Stub's Pattern.....	50%
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Combination and others.....	33 1/2%
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Heller's Farmers' Nippers.....	40%
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and Tools.....	40@100@10@10%
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The Nettleton Mfg. Co. Reversible	
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Cutting Nippers.....	40%
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P. S. & W. Tinner's Cutting Nip-	
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pers.....	40%
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Wm. Schollhorn Co.:	
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Bernard.....	33 1/2%
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Elm City.....	33 1/2%
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Lodi.....	50%
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Paragon.....	50%
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Swedish Side, End and Diagonal Cut-	
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ting Pliers.....	30%
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Utica Drop Forge & Tool Co.:	
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Pliers and Nippers, all kinds.....	40%
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Plumbs and Levels—

Chapin-Stephens Co.:	
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Plumbs and Levels.....	30@30@10@10%
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Chapin's Imp. Brass Cor. 40@40@10@10%	
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Pocket Levels.....	30@30@10@10%
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Diston's Plumbs and Levels.....	70%
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Diston's Pocket Levels.....	70%
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C. E. Jennings & Co.'s Iron.....	33 1/2%
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C. E. Jennings & Co.'s Iron, Adjust-	
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able.....	60@74%
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Stanley R. & L. Co.....	85%
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Stanley's Duplex.....	85%
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Woods' Extension.....	33 1/2%
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Poachers, Eggs

Buffalo Steam Egg Poachers, 30 doz.	
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No. 1, \$5.00; No. 2, \$3.00; No. 3, \$2.00; No. 4, \$1.20.....	50%
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Points, Glaziers—

Rulk and 1-lb. papers.....	1b. 10¢
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1 1/2-lb. papers.....	1b. 9¢@10¢
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1/4-lb. papers.....	1b. 9¢@11¢
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Pokes, Animal—

Pt. Madison Hawkeye.....	30 doz.	\$3.25
Pt. Madison Western.....	30 doz.	\$4.00

Police Goods—

Manufacturers' Lists.....	25@25@5%
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Towers.....	25%
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Polish—Metal, Etc—

Glasbier, No. 2, 5 lb can (powder),	
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each, \$1.25; 30 doz., \$12.00; No. 2, 10 lb	
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can (cake), each, \$2.50; 30 doz., \$24.00.	
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Prestoline Liquid, No. 1 (1/2 pt.), 30	
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doz., \$3.00; No. 2 (1 qt.), \$9.72.....	40%
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Prestoline Paste.....	40%
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George William Hoffman:	
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U. S. Metal Polish Paste, 3 oz.	
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boxes, 30 doz., 50¢; 30 doz., \$4.50;	
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1/2 lb boxes, 30 doz., \$1.25; 1 lb	
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boxes, 30 doz., \$2.25.	
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U. S. Liquid, 8 oz. cans, 30 doz.,	
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\$1.25; 30 doz., \$12.00.	
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Barkeepers' Friend Metal Polish, 30	
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doz., \$1.75; 30 doz., \$18.00.	
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Wynn's White Silk, 1/2 pt. cans, 30	
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doz., \$2.00.	
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Stove—

Black Eagle Benzine Paste, 5 lb cans,	
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Black Eagle, Liquid, 1/2 pt. cans.....	10¢
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Black Jack Paste, 3/4 lb cans, 30 doz.	
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Black Kid Paste, 5 lb cans, each, \$0.65	
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Ladd's Black Beauty Liquid, per	
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100 tins.....	\$6.75
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Joseph Dixon's, 30 gr. \$5.75.....	10%
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Dixon's Plumbago.....	10%
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Frederick's.....	10%
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Gem, 30 gr. \$1.50.....	10%
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Japanese.....	10%
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Jet Black.....	10%
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Peerless Iron Enamel, 10 oz. cans.....	10%
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Wynn's:	
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Black Silk, 5 lb pail.....	each 70¢
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Black Silk, 1/2 lb box.....	30 doz. \$1.00
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Black Silk, 5 oz. box.....	30 doz. \$0.75
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Black Silk, 1/2 pt. liq.....	30 doz. \$1.00
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Poppers, Corn—

1 qt., Square.....	gro. \$9.00
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1 qt., Round.....	gro. \$10.00
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1 1/2 qt., Square.....	gro. \$11.00
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2 qt., Square.....	gro. \$13.00
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Post Hole and Tree Aug-

ers and Diggers—

See also Diggers, Post Hole, &c.

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢;	
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46¢; 6 ft., 49¢.	
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Steel Hitching Posts.....	each \$1.30
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Potato Parers—

See Parers, Potato.

Pots, Glue—

Enamelled.....	40%
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Tinned.....	35%
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Powder—

In Canisters:	
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Duck, 1 lb.....	each 45¢
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Fine Sporting, 1 lb.....	each 75¢
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Rifle, 1/2 lb.....	each 15¢
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Rifle, 1 lb.....	each 25¢
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In Kegs:	
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12 1/2-lb. kegs.....	\$3.50
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25-lb. kegs.....	\$4.50
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King's Semi-Smokeless.....	\$6.50
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Keg (25 lb bulk).....	\$3.50
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Half Keg (12 1/2 lb bulk).....	\$1.90
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Quarter Keg (6 1/4 lb bulk).....	\$1.50
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Case 24 (1 lb cans bulk).....	\$4.50
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King's Smokeless.....	\$4.50
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Keg (25 lb bulk).....	\$12.00 \$15.00
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Half Keg (12 1/2 lb bulk).....	6.25 7.75
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Quarter Keg (6 1/4 lb bulk).....	3.25 4.00
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Case 24 (1 lb cans bulk).....	14.00 17.00
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Half case 12 (1 lb c. bk.).....	7.25 8.75
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Robin Hood Smokeless Shot Gun.....	50@20%
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Presses—

Enterprise Mfg. Co.....	20@25%
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Fruit and Jelly—

Seal Presses—

Morrill's No. 1, 30 doz., \$20.00.....	50%
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Pruning Hooks and Shears	
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See Shears.	
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Pullers, Cork—

Invincible Cork Puller.....	\$21.00
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Pullers, Nail—

Cyclops.....	50%
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Miller's Falls, No. 3, 30 doz., \$12.00.....	50%
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Morrill's No. 1, Nail Puller, 30 doz.	
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\$20.00.....	50%
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Pearson No. 1, Cyclone Spike Puller,	
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each \$30.00.....	50%
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Scranton, Case Lot.....	50%
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No. 2B (large).....	\$5.50
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No. 3B (small).....	\$5.00
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Smith & Hemenway Co.:	
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Diamond B, No. 2, case lots.....	30 doz. \$6.00
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Diamond B, No. 3, case lots.....	30 doz. \$5.50
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Giant No. 1, 30 doz. \$15; No. 2,	
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Rules	
Boxwood	60¢@10¢10
Ivory	35¢10¢@35¢10¢
Chapin-Stephens Co.	
Boxwood	60¢@10¢10
Flexfold	27¢10¢@10¢24
Ivory	35¢@35¢10¢10
Miscellaneous	50¢@35¢10¢10
Combination	55¢@55¢10
Stationers	10¢@10¢10
Keuffel & Esser Co.	
Folding, Steel	35¢10
Folding, Steel	35¢10
Lufkin's Steel	50¢10
Lufkin's Lumber	60¢
Stanley R. & L. Co.	
Boxwood	60¢
Ivory	35¢10
Miscellaneous	50¢
Zig Zag	40¢
Zig Zag, Pin Joint	42¢
Upson Nut Co.	
Boxwood	60¢@10¢10
Ivory	35¢10¢@35¢10¢10

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Saws

Atkins:	
Circular	50¢
Band	50¢@50¢10
Cross Cut	50¢
Mulay, Mill and Drag	50¢
One-Man Saw	40¢
Wood Saws	40¢
Hand, Compass, &c.	40¢
Chapin-Stephens Co.	
Turning Saws and Frames	30¢@30¢10
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	30¢@30¢10
Diston's:	
Circular, Solid and Ins'ted Tooth	50¢
Band, 2 to 14 in. wide	50¢
Band, 1/4 to 1 1/2	50¢
Crosscut	50¢
Narrow Crosscut	50¢
Mulay, Mill and Drag	50¢
Framed Woodsaws	50¢
Woodsaw Blades	50¢
Woodsaw Hods	50¢
Hand Saws, Nos. 12, 29, 9, 16, 100	25¢
DB, 120, 76, 71, 6	25¢
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1	30¢
0, 00, Combination	30¢
Compass, Key Hole, &c.	30¢
Butcher Saws and Blades	30¢
C. E. Jennings & Co.'s:	
Back Saws	25¢
Butcher Saws	30¢
Compass and Key Hole Saws	30¢
Framed Wood Saws	30¢
Hand Saws	30¢
Wood Saw Blades	30¢
Millers Falls:	
Butcher Saws	15¢10
Star Saw Blades	15¢10
Peace & Richardson's Hand Saws	30¢
Simonds:	
Circular Saws	50¢
Crescent Ground Cross Cut Saws	35¢
One-Man Cross Cuts	40¢10
Gang Mill, Mulay and Drag Saws	50¢
Gang Saws	50¢
Back Saws	25¢@25¢7 1/2
Butcher Saws	35¢@35¢7 1/2
Hand Saws	25¢@25¢7 1/2
Hand Saws, Bay State Brand	45¢
Compass, Key Hole, &c.	25¢@25¢7 1/2
Wood Saws	50¢@50¢3 1/2
Springfield Mach. Screw Co.	
Diamond Kitchen Saws	40¢10¢50
Butcher Saws Blades	35¢@40
Wheeler, Madden & Clemens Mfg. Co.'s Cross Cut Saws	50¢

Hack Saws—

Atkins' Hack Saw Blades A A A. 25¢

Diston's:

Concave Blades. 25¢

Keystone. 40¢

Hack Saw Frames. 30¢

Fitchburg File Works, The Best. 35¢

C. E. Jennings & Co.'s:

Hack Saw Frames, Nos. 175, 180. 40¢7 1/2

Hack Saws, Nos. 175, 180, complete. 40¢7 1/2

Goodell's Hack Saw Blades. 35¢@50

Griffin's Hack Saw Frames. 35¢@50

Griffin's Hack Saw Blades. 35¢@50

Springfield Mach. Screw Co.

Quickcut Emery Rubbing Bricks, 33 1/4%
Hindustan No. 1, 8 g'lar, 10 lb 8¢
Hindustan No. 1, Small, 10 lb 8¢
Axe Stones (all kinds) 2 1/2%
Turkey Oil Stones, Extra, 5 to 8 in. 8¢
Queer Creek Stones, 4 to 9 in. 20¢
Queer Creek Slips, 40¢
Sand Stone, 6¢

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., \$8.00
gro., 12 in., \$10.80.
Norton Emery Scythe Stones:
Less than gross lots, \$9.00
One gross or more, \$7.20
Lots of 10 gross or more, \$6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S., 8 gro., \$12.00
Lamolle S. S., 8 gro., \$11.00
White Mountain S. S., 8 gro., \$9.00
Green Mountain S. S., 8 gro., \$6.00
Extra Indian Pond S. S., 8 gro., \$7.50
No. 1 Indian Pond S. S., 8 gro., \$7.00
No. 2 Indian Pond S. S., 8 gro., \$4.50
Leader Red End S. S., 8 gro., \$4.50
Quick Cut Emery, 8 gro., \$10.00
Pure Corundum, 8 gro., \$18.00
Crescent, 8 gro., \$7.00
Emery Scythe Rifles, 2 Coat, \$8
Emery Scythe Rifles, 3 Coat, \$10
Emery Scythe Rifles, 4 Coat, \$12
Balance of 1904 list 35 1/2%

Stoppers, Bottle—

Victor Bottle Stoppers, 100 gro., \$9.00

Stops—Bench—

Millers Falls, 15¢ 10%
Morrill's, 10 doz., No. 1, \$10.00, 50%
Morrill's, No. 2, \$12.50, 50%

Door—

Chapin-Stephens Co., 60¢ 60¢ 10%

Plane—

Chapin-Stephens Co., 20%

Straps—Box—

Cary's Universal, case lots, 25¢ 20%

Hame—

Covert's Saddlery Works, 60¢ 10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz., 60¢ 60¢ 10%

Socket, doz., 1.00

Buttard, doz., \$4.00

Excelsior Stretcher and Tack Hammer Combined, doz., \$6.00, 20%

Strops, Razor—

Star Diagonal Strop, 25%

Stuffers, Sausage—

Enterprise Mfg. Co., 25¢ 25¢ 1 1/4%

National Specialty Co., list Jan. 1, 1904, 30¢ 5%

Sweepers, Carpet—

National Sweeper Co.:
Leads XV, Roller Bearing, 10 doz., \$120.00

Hawleywhite, Roller Bearing, Sil-
ver Plated, \$72.00

Sterator, Roller Bearing, N'kel, \$60.00

Ye Mission, Roller Bearing, Ox-
idized Coppered, \$36.00

Transparent, Roller Bearing, Pl-
te Glass top, N'kel, \$36.00

National Queen, Roller Bearing,
Fancy Veneers, \$27.00

Loyal, Roller Bearing, Veneers,
Nickel, \$25.00

Triple Medal, Roller Bearing,
Nickel, \$24.00

Marion, Roller Bearing, N'kel, \$24.00

Marion Queen, Roller Bearing,
Nickel, \$24.00

Monarch, Roller Bearing, N'kel, \$22.00

Monarch, Roller Bearing, Jap., \$20.00

Perpetual, Regular B'rgs, N'kel, \$20.00

Perpetual, Regular B'rgs, Jap., \$18.00

Monarch Extra (17 in. case), Roller
Bearing, Nickel, \$36.00

Monarch Extra (17 in. case), Roller
Bearing, Japanned, \$33.00

Auditorium (26 in. case), Roller
Bearing, Nickel, \$54.00

Mammoth (30 in. case), Roller
Bearing, Nickel, \$60.00

NOTE—Rebates: 50¢ per dozen on
three-dozen lots; \$1 per dozen on five-
dozen lots; \$2 per dozen on ten-dozen lots;
\$3.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:
Model E, Sanitaire, doz., \$25.00

Model A, Sterling, doz., \$25.00

Model B, Sterling, Nickel, doz., \$23.00

Model B, Sterling, Japaned, doz., \$21.50

Model C, Sterling, doz., \$21.50

Model D, Sterling, doz., \$19.50

**Tacks, Finishing Nails,
&c.**

New List, May 1, 1905.

American Carpet Tacks, 90¢ 40¢

American Cut Tacks, 90¢ 40¢

Sveedes Cut Tacks, 90¢ 40¢

Sveedes Upholsterers', 90¢ 40¢

Gimp Tacks, 90¢ 40¢

Lace Tacks, 90¢ 40¢

Trimmers' Tacks, 90¢ 40¢

Looking Glass Tacks, 65¢

Bill Posters' and Railroad Tacks,
90¢ 40¢

Hungarian Nails, 85¢

Finishing Nails, 70¢ 10¢

Trunk and Clout Nails, 80¢

**NOTE—The above prices are for
Standard Weights. An extra 5% is given
on Medium Weights, and an extra 10% is
given on Light weights.**

Miscellaneous—

Double Pointed Tacks, 90¢ 45 or 6 tens

Tanks, Oil—

See also Nails, Wire.

Emerald, R. M. Co., 30-gal., \$3.40

Emerald, R. M. Co., 60-gal., \$4.25

Queen City, R. M. Co., 30-gal., \$3.65

Queen City, R. M. Co., 60-gal., \$4.50

Tapes, Measuring—

American Asses' Skin, 50¢

Patent Leather, 25¢ 30¢ 45%

Steel, 3 1/2-5 1/2%

Chesterman's, 25¢ 25¢ 45%

Eddy Asses' Skin, 40¢ 10¢ 50%

Eddy Patent Leather, 25¢ 30¢ 45%

Eddy Steel, 40¢ 40¢ 10%

Keuffel & Esser Co., 40¢ 10¢ 50%

Favorite, Ass Skin, 40¢ 10¢ 50%

Favorite, Duck and Leather, 25¢ 40¢ 10%

Metallie and Steel, lower list, 35¢ 35¢ 5%

Pocket, 35¢ 35¢ 5%

Lufkin's:
Asses' Skin, 40¢ 10¢ 50%

Metallie, 30¢ 30¢ 5%

Patent Bend, Leather, 25¢ 40¢ 10%

Pocket, 40¢ 40¢ 5%

Steel, 33 1/4¢ 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or
headed, 3/4-inch and larger—
per 100 lbs. \$2.75 to \$3.00

Thermometers—

Tin Case, 80¢ 10¢ 80¢ 10¢ 5%

Ties, Bale—Steel Wire—

Single Loop, 80¢ 2 1/2%

Monitor, Cross Head, &c., 70%

Brick Ties—

Niagara Brick Ties, 25¢ 10%

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, sold
very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works, 60¢ 10%

Tire Benders, Upsetters, &c.—

See Benders and Upsetters, Tire.

Tools—Coopers—

L. & I. J. White, 20¢ 20¢ 5%

Hay—

Myers' Hay Tools, 50%

Stowell's Hay Carriers, 50%

Stowell's Hay Forks, 50%

Stowell's Fork Pulleys, 50%

Miniature—

Smith & Hemenway Co.'s, 25%

Saw—

Atkins' Cross Cut Saw Tools, 40%

Simonds' Improved, 33 1/2%

Simonds' Crescent, 25%

Ship—

L. & I. J. White, 20¢ 20¢ 5%

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz.,
\$1.15 to \$1.25; gro., \$11.50 to \$12.00

Harper, Champion or Paragon,
doz., \$1.25 to \$1.40; gro., \$13.00 to \$13.50

Game—

Imitation Onaida, 75¢ 75¢ 5%

Newhouse, 30¢ 45¢ 5%

Victor & Norton, 70¢ 10%

Onaida Community Jump, 50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes,
8 1/4¢ 1.00

Mouse, Round or Square Wire,
doz. 85¢ 90¢

Marty French Rat and Mouse Traps
(Genuine):
No. 1, Rat, each \$1.21; doz., \$13.25

No. 3, Rat, doz., \$6.50; case of 50
doz., \$5.75 doz.

No. 3 1/2, Rat, doz., \$5.25; case of 72
doz., \$4.70 doz.

No. 4, Mouse, doz., \$3.85; case of 150
doz., \$3.00 doz.

No. 5, Mouse, doz., \$3.00; case of 150
doz., \$2.25 doz.

Trimmers, Spoke—

Wood's E, 50%

Trowels—

Disston Brick and Pointing, 30%

Disston Plastering, 25%

Disston Standard Brand and Gar-
den Trowels, 35%

Kohler's Steel Garden Trowels, 5 in.,
1 1/2 lb., \$4.80

Kohler's Steel Garden Trowels, 6 in.,
1 1/2 lb., \$6.00

Never-Break Steel Garden Trowels,
1 1/2 lb., \$6.00

Rose Brick and Plastering, 25%

Woodrough & McParlin, Plastering, 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern, 50¢ 10%

Western Pattern, 50¢ 10%

Handy Trucks, 10 doz., \$16.00

Grocery, doz., \$15.00

Daisy Stove Trucks, Improved Pat-
tern, doz., \$18.50

McKinney Trucks, each \$10.00

Model Stove Trucks, doz., \$18.50

Tubs, Wash—No. 1 2 3

Galvanized, per doz., \$1.25 to \$1.50

Galvanized Wash Tubs (R. M. Co.):
No. 1, 2, 3, 10, 20, 30

Per doz., net, \$5.70 to \$6.30 to \$6.60 to \$7.20 to \$8.10

Twine, Miscellaneous—

Flax Twine: BC. B.

No. 9, 1/4 and 1/2-lb. Balls, 22¢ 24¢

No. 12, 1/4 and 1/2-lb. Balls, 18¢ 20¢

No. 18, 1/4 and 1/2-lb. Balls, 16¢ 18¢

No. 24, 1/4 and 1/2-lb. Balls, 16¢ 18¢

No. 36, 1/4 and 1/2-lb. Balls, 15¢ 17¢

Chalk Line, Cotton 1 1/2-lb.
Balls, 25¢ 30¢

Cotton Mops, 6, 9, 12 and 15 lb.
to doz., 10¢ 18¢

Cotton Wrapping, 5 Balls to lb.,
according to quality, 14¢ 20¢

American 2-Ply Hemp, 1/4 and
1/2-lb. Balls, 13¢ 14¢

American 3-Ply Hemp, 1-lb.
Balls, 14¢ 14¢

India 2-Ply Hemp, 1/4 and 1/2-lb.
Balls (Spring Twine), 9¢ 4¢

India 3-Ply Hemp, 1-lb. Balls, 8¢ 4¢

India 3-Ply Hemp, 1 1/2-lb. Balls,
7¢ 8¢

2, 3, 4 and 5-Ply Jute, 1 1/2-lb.
Balls, 9¢ 10¢

Mason Line, Linc., 1/2-lb. Bls., 4¢

No. 26 1/2 Mattress, 1/4 and 1/2-lb.
Balls, 3¢ 7¢

Wool, 3 to 6 ply, B 6¢; A 6 1/2¢

Vises—

Solid Box, 60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable, 40%

Standard, 40%

Amateur, Hd. Co., 40%

Columbian, Hd. Co., 40%

Emmert Universal:
Pattern Makers' No. 1, \$15.00; No.
2, \$12.50.

Machinist and Tool Makers' No.
1A, \$12.50; No. 5A, \$7.00; No. 6A,
\$10.00; No. 10A, \$22.50.

Presto Quick Acting, 25¢ 25¢ 5%

Tiger Machinists', 40%

Fisher & Norris Double Screw, 15¢ 10%

Hollands:
Machinists', 40¢ 40¢ 5%

Keystone, 40¢ 40¢ 5%

Lewis Tool Co.:
Adjustable Jaw, 30%

Monarch, 50%

Solid Jaw, 50%

Massey Vise Co.:
Clincher, 40%

Keystone, 40%

Lightning Grip, 20%

Merrill's, 20%

Millers Falls, 60¢ 10%

Parker's:
Victor, 20¢ 25%

Regular, 20¢ 25%

Vulcan's, 40¢ 45%

Combination Pipe, 55¢ 60%

Prentiss, 20¢ 25%

Sargent's, 40%

Snediker's X. L., 33 1/2%

Stephens, 33 1/2%

Williamson Mfg. Co. Double Swivel,
40¢ 45%

Saw Filers—

Disston's D 3 Clamp and Guide, 30
doz., \$30.

Perfection Saw Clamps, 30 doz., \$4.50

Reading, 60%

Wentworth's Rubber Jaw, Nos. 1, 2
and 3, 45¢ 50%

Wood Workers—

Massey Vise Co.:
Lighting Grip, 15%

Perfect, 15%

Wyman & Gordon's Quick Action,

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—	
Bar Iron from store—	
Refined Iron:	
1 to 1½ in. round and square.....	\$ 2.00¢
1½ to 4 in. x ½ to 1 in.....	\$ 2.20¢
1½ to 4 in. x ½ to 5-16.....	\$ 2.30¢
Rods—½ and 11-16 round and square.....	\$ 2.30¢
Angles:	
8 in. x ½ in. and larger.....	\$ 2.40¢
(except 3½ in. and 4 x ½ 2.50¢)	
8 in. x 3-16 in. and ½ in.....	\$ 2.55¢
1½ to 2½ in. x ½ in.....	\$ 2.35¢
1½ to 2½ in. x 3-16 in. and thicker.....	\$ 2.30¢
1 to 1½ in. x 3-16 in.....	\$ 2.35¢
1 to 1½ in. x ½ in.....	\$ 2.40¢
¾ x ½ in.....	\$ 2.55¢
¾ x ½ in.....	\$ 2.65¢
¾ x ½ in.....	\$ 3.70¢
¾ x 3-32 in.....	\$ 4.20¢
Teas:	
1 in.....	\$ 2.65¢
1½ in.....	\$ 2.45¢
1½ to 2½ in.....	\$ 2.35¢
3 in. and larger.....	\$ 2.50¢
Beams.....	\$ 2.30¢
Channels, 3 in. and larger.....	\$ 2.30¢
Hands—1½ to 6 x 3-16 in. No. 8.....	\$ 2.35¢
"Burden's Best" Iron, base price.....	\$ 3.05¢
Burden's "H. B. & S." Iron, base price.....	\$ 3.00¢
"Unter".....	\$ 3.10¢
Norway Bars.....	\$ 3.40¢
Norway Shapes.....	\$ 3.80¢
Merchant Steel from Store—	
	per lb.
Bessemer Machinery.....	\$ 2.00¢
Toe Calk, Tire and Sleigh Shoe.....	\$ 2.50¢@3.00¢
Best Cast Steel, base price in small lots.....	\$ 7¢
Sheets from Store—	
Black.	
	One Pass, C.R. R. G. Soft Steel. Cleaned.
No. 14.....	\$ 2.70¢
Nos. 18 to 24.....	\$ 2.85¢
No. 27.....	\$ 3.00¢
No. 28.....	\$ 3.10¢
Russia, Planished, &c.	
Genuine Russia, according to assortment.....	\$ 11¼¢@14¢
Patent Planished.....	\$ 10¢; B, 9¢, net.
Galvanized.	
Nos. 14 to 16.....	\$ 3.05¢
Nos. 22 to 24.....	\$ 3.45¢
No. 27.....	\$ 3.90¢
No. 28.....	\$ 4.15¢
No. 20 and lighter 36 inches wide, 25¢ higher.	

Tin Plates—	
American Charcoal Plates (per box.)	
A.A.A. Charcoal:	
IC, 14 x 20.....	\$6.30
IX, 14 x 20.....	7.55
A. Charcoal:	
IC, 14 x 20.....	\$5.35
IX, 14 x 20.....	6.45
American Coke Plates—Bessemer—	
IC, 14 x 20.....	\$4.35
IX, 14 x 20.....	6.35
American Terne Plates—	
IC, 20 x 28 with an 8 lb. coating.....	\$8.40
IX, 20 x 28 with an 8 lb. coating.....	10.40
Seamless Brass Tubes—	
Outside Diameter. Net. Base Price 2¢	
Stubs' W. G.	1/4 5-16 3/8 7-16 1/2 9-16 5/8 3/4 1 1 1/4 1 1/2
4-11	28 29 27 27 27 27 27 27 27 27
12	28 29 27 27 27 27 27 27 27 27
13	28 29 27 27 27 27 27 27 27 27
14	28 29 27 27 27 27 27 27 27 27
15	28 29 27 27 27 27 27 27 27 27
16	28 29 27 27 27 27 27 27 27 27
17	28 29 27 27 27 27 27 27 27 27
18	28 29 27 27 27 27 27 27 27 27
19	28 29 27 27 27 27 27 27 27 27
20	28 29 27 27 27 27 27 27 27 27
21	28 29 27 27 27 27 27 27 27 27
22	28 29 27 27 27 27 27 27 27 27
23	28 29 27 27 27 27 27 27 27 27
24	28 29 27 27 27 27 27 27 27 27
25	28 29 27 27 27 27 27 27 27 27

Iron Pipe Sizes—Brass	
1/4 1/2 3/4 1 1 1/4 1 1/2 2 2 1/4 3 3 1/2 4 4 1/2 5 6 inch	30 29 24 23 22 22 22 22 22 22 23 24 26 28 29¢@30¢
Braze Brass Tubing.	
Discount from List June 6, 1898, 20&5%.	
Bronze and Copper Tubing advance on Brass List 3¢	
Roll and Sheet Brass—	
Discount from List June 6, 1898, 15%.	
Brass Wire.	
Discount from List June 6, 1898, 15%	
Brass Rods.	
Discount from List 15%	

METALS—	
Tin—	
Straits Pig.....	\$ 40¼¢
Copper—	
Lake Ingot.....	\$ 19 ¢@1
Electrolytic.....	\$ 18¼¢@1
Casting.....	\$ 18¼¢@1
Sheet Copper Hot Rolled, 16 oz.....	\$ 18¼¢@1
Sheet Copper Cold Rolled, 1¢ ¢ advance over Hot Rolled.....	
Sheet Copper Polished 20 in. wide and under, 1¢ ¢ advance over Cold Rolled.....	
Sheet Copper Polished over 20 in. wide, 2¢ ¢ advance over Cold Rolled.....	
Bottoms, Pits and Flats.....	\$ 27¢
Planished Copper, 1¢ ¢ more than Polished.....	
Spelter—	
Western.....	\$ 6¼¢
Zinc.	
No. 9, base, casks, \$ 8¼¢ | Open.....	\$ 1
Lead.	
American Pig.....	\$ 5¼¢@1
Bar.....	\$ 6¼¢@1
Soldier.	
1/2 & 1/2, guaranteed.....	\$ 23¼¢@1
No. 1.....	\$ 24¼¢@1
Refined.....	\$ 10¢
Prices of Soldier Indicated by private brand vary according to composition.	
Antimony—	
Cookson.....	\$ 22¢
U. S.....	\$ 22¢
Other Brands.....	\$ 21¢
Aluminum—	
No. 1 Aluminum (guaranteed over 99% pure), in 1¢ for remelting:	
Small lots.....	nom
100-lb lots.....	nom
Old Metals.	
Dealers' Purchasing Prices Paid in New York.	
Copper, Heavy Cut and Crucible.....	\$ 1
Copper, Heavy and Wire.....	\$ 1
Copper, Light and Wire.....	\$ 1
Heavy Brass.....	\$ 11
Light Brass.....	\$ 9
Lead.....	\$ 5
Tea Lead.....	\$ 4
Zinc.....	\$ 4.7
Pure Aluminum, Sheet.....	\$ 16.00¢@1
No. 1 Yard Wrought.....	\$ 13.00¢@1
Wrought Pipe.....	\$ 14.00¢@1
No. 1 Machinery Cast.....	\$ 11.00¢@1
Stove Plate.....	\$ 11.00¢@1

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

ISSUED EVERY THURSDAY MORNING.

Subscription, postpaid, \$5.00 a year.

TWO DOLLAR EDITION, \$2.00 a year; DOLLAR EDITION, \$1.00 a year, to the United States, British America, Mexico, Hawaii, Cuba, Philippine Islands. OTHER COUNTRIES: Weekly Edition, \$7.50; Semi-monthly Edition, \$4.00; Monthly Edition, \$2.50.

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ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.